# DIVERSIFIED METAL FABRICATORS, INC.

## Parts & Service Manual

# RW-1019

May 2015

SERIAL NUMBER (FRONT) _____

SERIAL NUMBER (REAR) _____

NOTE:
Please refer to the serial numbers when ordering parts or inquiring about warranty items.

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## Message from DMF

Thank you for choosing DMF Railgear. We make every effort to provide quality, safe and rugged products for the railroad. We hope you'll find our gear to be satisfactory in every way. We take product support very seriously, so if you have any questions, please contact us.

Manuals, service bulletins and general information are available on our website listed below.

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# 1.0 GENERAL INFORMATION

**1.0 General Information**

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## 1.1 How to Use this Manual

No matter what your job function is, Operation, Installation, Maintenance, or Repair, it is your responsibility to familiarize yourself with the entire manual. Once you have read the entire manual, there are some specific sections that you will want to pay special attention to, depending on your role.

If you find anything missing, incorrect or unclear in this manual, please contact us. We are always trying to improve our manuals.

We reserve the right to update our manuals without notice. You can download a current manual at our website (http://www.dmfatlanta.com).

### 1.1.1 Operation

Once you have read this entire manual, there are some key sections that you may want to mark for convenient future reference, including Section 1.0 General, 2.0 Operations, and 3.0 Routine Maintenance. Section 2.0 will give you very important guidelines on operating your Railgear-equipped vehicle both on the highway and on rail. Section 3.0 will cover your daily/routine maintenance check that should be performed every time before you operate your vehicle. This section will also cover semiannual and annul routine maintenance procedures that should be performed to promote Railgear longevity.

### 1.1.2 Installation

Once you have read this entire manual, there are some key sections that you may want to mark for convenient future reference, including Section 1.0 General, Section 4.0 Installation, and 5.0 Technical Details. Section 4.0 will give you written instructions and drawings. In Section 5.0 Technical Details, there are additional detailed drawings grouped according to their major systems and components. For your convenience, we have included a separate packet containing several duplicate Installation Drawings in the kit that accompanies your set of Railgear.

### 1.1.3 Routine Maintenance

Once you have read this entire manual, there are some key sections that you may want to mark for convenient future reference, including Section 1.0 General, and Section 3.0 Routine Maintenance. In Section 3.0, you will find information about routine maintenance and inspection items on a daily, weekly, and bi-annual basis.

### 1.1.4 Repair

Once you have read this entire manual, there are some key sections that you may want to mark for convenient future reference, including Section 1.0 General, Section 4.0 Installation, and 5.0 Technical Details. In Section 5.0 Technical Details, you will find several sections mainly composed of detailed system and assembly drawings. Refer to the section that is related to your specific repair. Also refer to Section 4.0 Installation, and the related area within, to ensure you are properly performing the repair as per initial installation requirements.

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## 1.2 General Description

DMF's RW-1019 Railgear is our hi-rail gear for medium duty chassis in the 10,000 to 19,500 lb GVWR range. The front guide wheel assembly attaches to the frame and front axle and lifts the front truck tires off the track, thus utilizing the vehicle's front suspension. This design supports the vehicle as it was intended and helps the truck navigate curves smoothly and damps out the effects of track irregularities. The rear assembly attaches directly to the truck frame behind the rear axle spring hangers. It deploys with an articulating dual scissor action that allows the rear Railgear to be moved both vertically and horizontally. This mechanism provides the "side shift" action which has made DMF gear so well known in the industry. It gives operators a greater margin for aligning the vehicle to the track, which speeds and simplifies the process of getting the vehicle on rail.

Materials:
All structural members and brackets are constructed of carbon steel. The 10" guide wheels for DMF RW-1019 Railgear are machined from hardened steel castings and are fitted to high strength alloy steel axles with heavy-duty tapered roller bearings.

Installation:
Both DMF front and rear guide wheel units bolt to the truck frame using only hand tools found in any shop. They are designed to minimize the amount of space required and in many cases fit within the existing boundaries of the vehicle. The front units, however, sometimes require a bolt-on frame extension to complete the installation. Rear RW-1019 Railgear mounts below the top of frame and directly behind the rear axle spring hangers.

Brakes:

**NOTE:**

The rail wheel brake system is intended to assist the existing vehicle brakes when in the rail mode. As the vehicle rear tires are in contact with the railhead, the primary braking effort is derived from the rubber tires. Rail wheel brakes alone are insufficient to stop the vehicle in a reasonable distance.

The optional RW-1019 rail brakes are of the hydraulic actuated external Cobra shoe type. The rail brakes use the truck's hydraulic system to supply the clamping force. The rail brakes are applied simultaneously with the truck brakes when the operator presses the brake pedal. There is also a dashboard-mounted switch that permits the operator to enable or disable the rail braking system.

Options:
There are several options available for RW-1019 Railgear. The most commonly ordered options include rail wheel brakes for improved stopping on rail, insulated wheels to prevent crossing signal actuation, rail sweeps to clear the rail of potentially damaging materials, and various retention systems to fit your application. Other less common options are non-standard track gauges and slotted links for improved hi-rail performance at crossings.

**NOTE:**

There are currently 4 approved chassis for our 1019 series of Railgear. While very similar in some aspects, there are variances between the components and installation procedures of these chassis-specific assemblies. To address this, we have established this manual in a format giving general instructions that apply to all chassis followed by specific instructions regarding each unique variation. Where necessary, notes will be provided to ensure clarity regarding which chassis is applicable. Please locate and become familiar with the sections specific to your application.

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## 1.3 Currently Approved Chassis

**Ford**

'08-Present F-4/550 (w/ 245/70R19.5 tires) (Aft fuel tank not recommended)

**Dodge/Sterling**

09-Present Dodge 45/5500
08-09 Sterling Bullet 45/5500 (discontinued in 2009)

**Chevy/GM**

'02-'09 C4/5500 (discontinued in 2010)

**08-Present Ford F-4/550**

**09-Present Dodge 45/5500**
**08-09 Sterling Bullet 45/5500**

**'02-'09 GM C45/5500**

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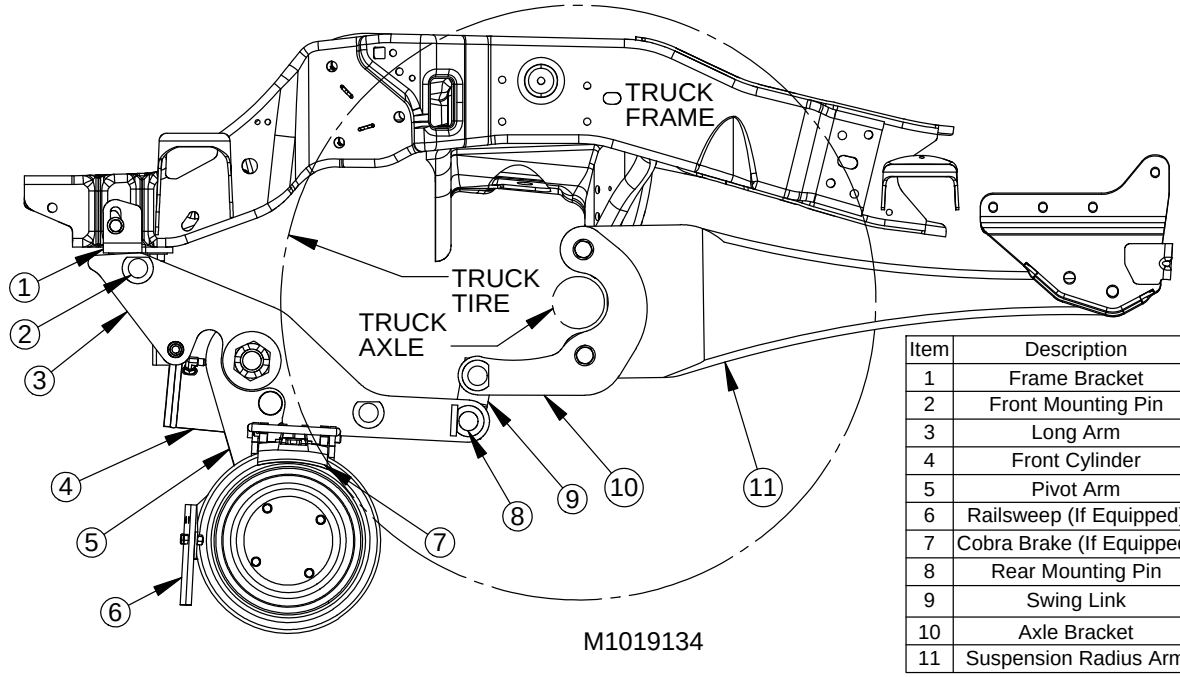
# 1.4 Front Railgear

### 1.4.1 Standard Front Railgear Components

Figures 1.4.1.A thru 1.4.1.C identify the individual parts of the installed front Railgear. These item descriptions will be used throughout this installation manual. DMF Railgear assemblies are also referred to as guide wheels, rail wheels, or hi-rail gear.

Front Railgear
GVWR Range: 10,000 to 19,500 lbs. @ 20 MPH
Approx. Installed Weight (Front): 847 (Ford), 847 (Dodge), 675 (GM) lbs.
Capacity: 8,200 pounds per Railgear axle @ 20 MPH

For detailed drawings, see Section 5.0, and for installation instructions, see Section 4.0.




| Item | Description |
|---|---|
| 1 | Frame Bracket |
| 2 | Front Mounting Pin |
| 3 | Long Arm |
| 4 | Front Cylinder |
| 5 | Pivot Arm |
| 6 | Railsweep (If Equipped) |
| 7 | Cobra Brake (If Equipped) |
| 8 | Rear Mounting Pin |
| 9 | Swing Link |
| 10 | Axle Bracket |
| 11 | Suspension Radius Arm |

**1.4.1.A** ’08 Ford F-4/550 Front Railgear Components

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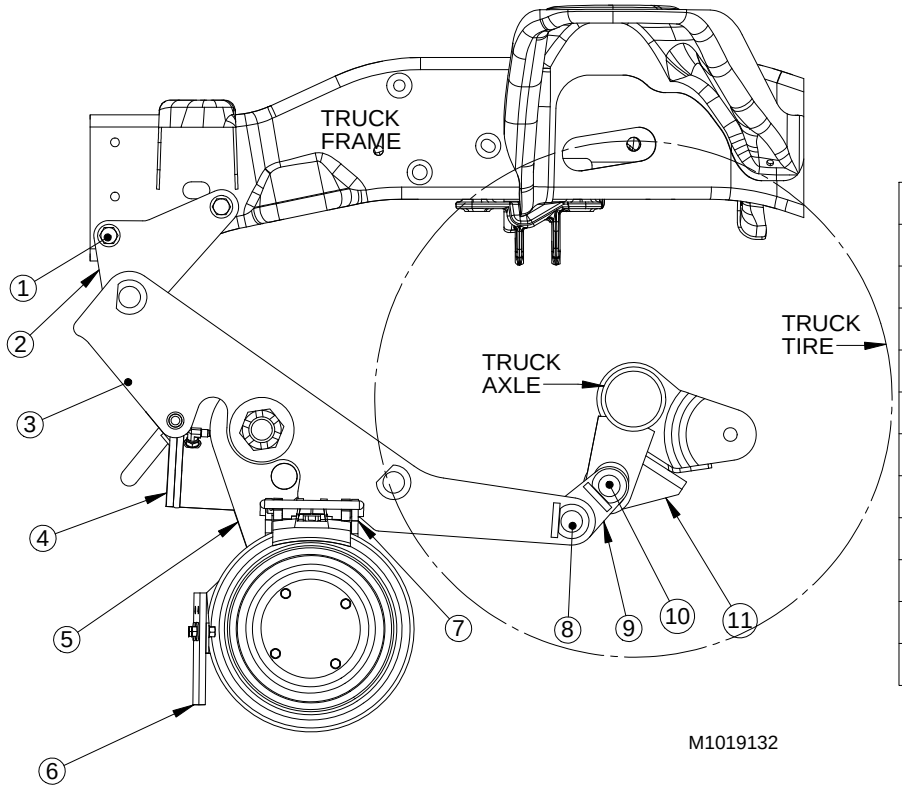
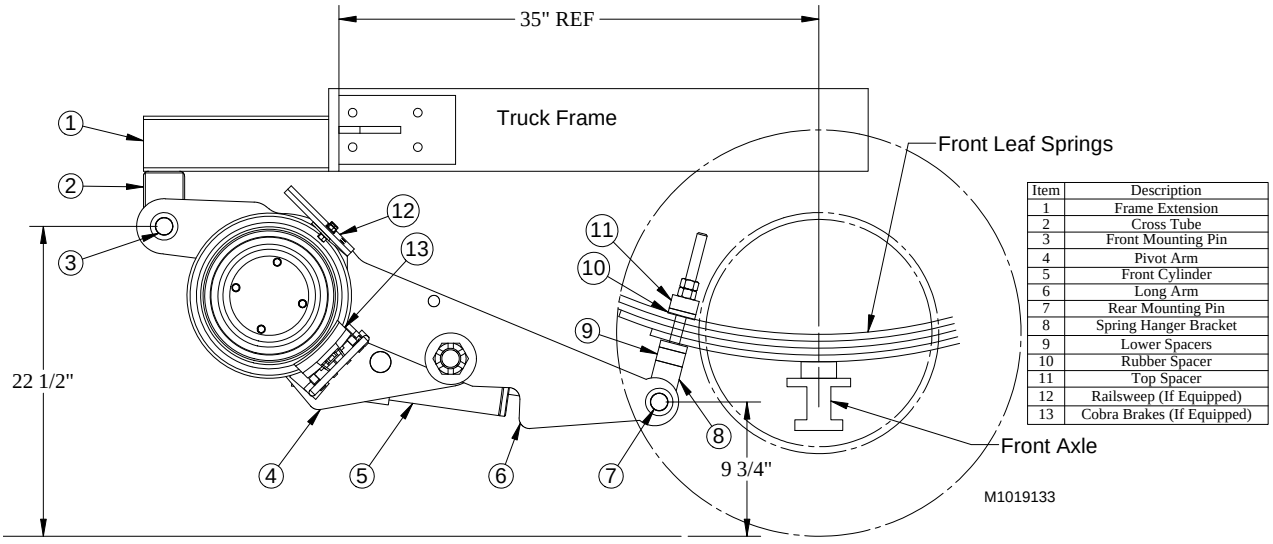



| ITEM | DESCRIPTION |
|---|---|
| 1 | FRONT MOUNTING PIN |
| 2 | FRAME BRACKET |
| 3 | LONG ARM |
| 4 | FRONT CYLINDER |
| 5 | PIVOT ARM |
| 6 | RAILSWEEP (IF EQUIPPED) |
| 7 | COBRA BRAKE (IF EQUIPPED) |
| 8 | REAR MOUNTING PIN |
| 9 | SWING LINK |
| 10 | SWING LINK PIN |
| 11 | AXLE BRACKET |

**1.4.1.B** '08 Dodge/Sterling 4/5500 Front Railgear Components




| Item | Description |
|---|---|
| 1 | Frame Extension |
| 2 | Cross Tube |
| 3 | Front Mounting Pin |
| 4 | Pivot Arm |
| 5 | Front Cylinder |
| 6 | Long Arm |
| 7 | Rear Mounting Pin |
| 8 | Spring Hanger Bracket |
| 9 | Lower Spacers |
| 10 | Rubber Spacer |
| 11 | Top Spacer |
| 12 | Railsweep (If Equipped) |
| 13 | Cobra Brakes (If Equipped) |

**1.4.1.C** '08 GM 4/5500 Front Railgear Components

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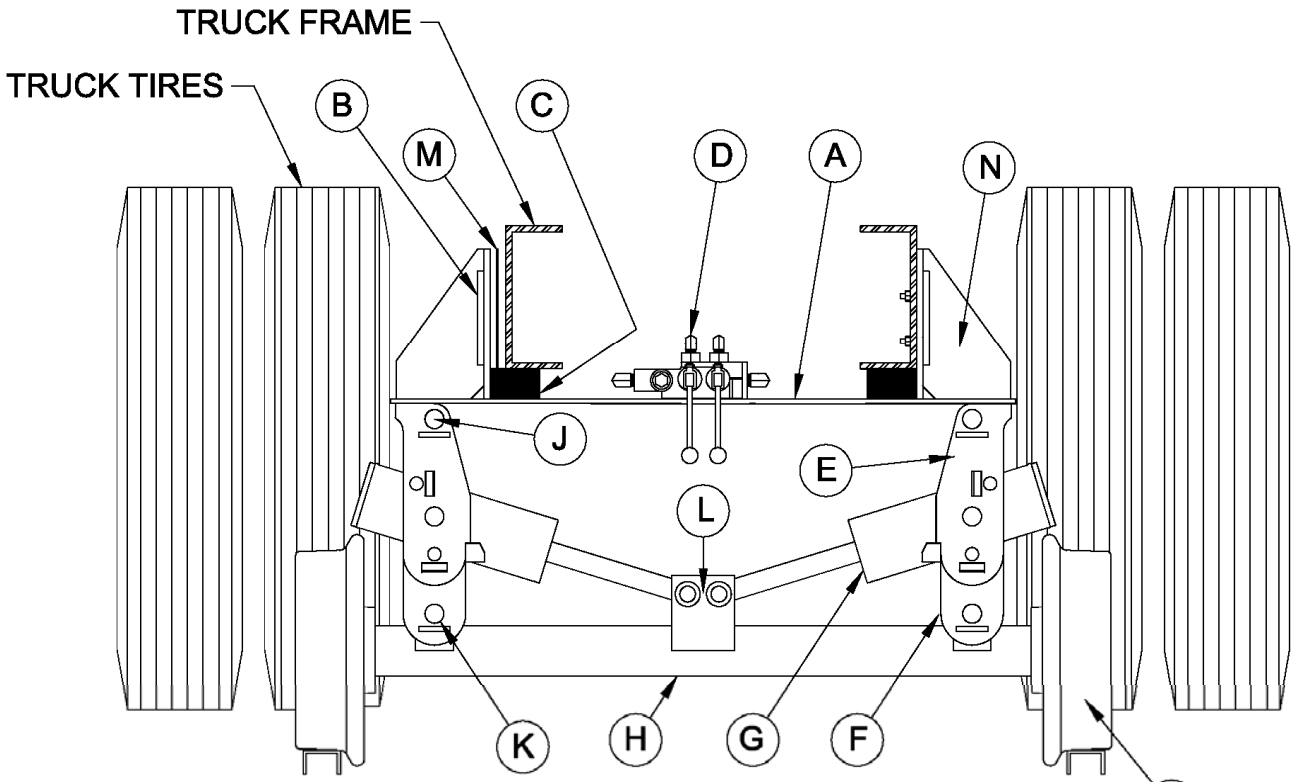
## 1.5 Rear Railgear

### 1.5.1 Rear Railgear Components

Rear Railgear
GVWR Range: 10,000 to 19,500 lbs.
Approx. Installed Weight (Rear): 950 lbs.
Capacity: 8,200 pounds per Railgear axle @ 20 MPH

Figure 1.5.1.A shows the individual parts of the installed rear Railgear with the Rail Wheels in the rail position. These item descriptions will be used throughout this installation manual.




| ITEM | DESCRIPTION |
|---|---|
| A | REAR FRAME MOUNTING BRACKET FLAT PLATE |
| B | (4) HOLE MOUNTING PLATE (INSIDE BRACKET) |
| C | SPACER (S) (IF REQUIRED) |
| D | REAR HYDRAULIC VALVE ASSEMBLY |
| E | REAR UPPER LINKS (4) |
| F | REAR LOWER LINKS (4) |
| G | REAR LIFT CYLINDERS (2) |

| ITEM | DESCRIPTION |
|---|---|
| H | REAR AXLE |
| I | REAR RAIL WHEEL |
| J | REAR UPPER MOUNTING PINS |
| K | REAR LOWER MOUNTING PINS |
| L | REAR CYLINDER PINS |
| M | REAR BRACKET SHIM(S) PLATE |
| N | SIDE PLATE |

**Figure 1.5.1.A** Rear Railgear Components

For detailed drawings, see Section 5.0, and for installation instructions, see Section 4.0.

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## 1.6 Anti-Lock Brake (ABS), Traction Control & Electronic Stability Control Systems (ESC)

**Please refer to the following note relevant to your chassis:**

### 1.6.1 Ford F4/550 ABS & Traction Control Electronic Stability Control (ESC) Details

**Ford F4/550 ABS/Traction/ESC Notes:**
There are unique guidelines for operation of RW-1019 equipped 2011 Ford F-4/550's on rail. It is imperative to ensure that the vehicle is in 2WD & the traction control system is disengaged. Failure to do so will result in both acceleration & braking issues on rail due to overcompensation by these systems.

### 1.6.2 Dodge 4/5500 ABS & Traction Control Electronic Stability Control (ESC) Details

**Dodge 4/5500 ABS Notes:**
Dodge 4/5500 chassis will display an ABS warning on the instrument panel when operated on rail. This warning light will go off after being operated on road for 1-2 miles.

### 1.6.3 GM 4/5500 ABS & Traction Control Electronic Stability Control (ESC) Details

**GM 4/5500 ABS Notes:**
GM 4/5500 chassis will display an ABS warning on the instrument panel when operated on rail. This warning light will go off after being operated on road for 1-2 miles.

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# 2.0 OPERATIONS

**2.0 Operations**

2.1 Before You Operate the Railgear
2.1.1 Familiarize Yourself with the Railgear
2.1.2 Daily Inspection
2.2 Highway Operation
2.3 Getting on the Rail
2.3.1 Getting onto the Rail
2.3.2 Lower Rear Guide Wheels
2.3.3 Lower Front Guide Wheels
2.3.4 On the Tracks
2.4 Getting off of the Rail
2.4.1 Removing Truck from Track

## 2.1 Before You Operate the Railgear

### 2.1.1 Familiarize Yourself with the Railgear

Clearances & Approach Angles

The installation of Railgear typically reduces the ground clearance & approach angle in the front and back. In some installations, the guide wheels extend slightly beyond the corners of the front bumper. Operators should familiarize themselves with the modified clearance & approach angles.

Railgear Retention Systems and Locations

Walk around vehicle and identify the location and type of Railgear retention system(s) that are installed on your particular vehicle.
DMF offers the following Railgear retention options:

- Manual Pin-Offs
- Cable Remote Pin-Offs
- Hook Lock Mechanism (front only)
- Lever Pin-Offs (front only)

See section 5.2 for more information on Railgear retention systems.

**NOTE:**
**DMF's Rear Cylinders are equipped with integral locking valves; however, Railgear retention systems are still required to be engaged in both the highway and rail positions.**

Operation Controls

- Locate and familiarize yourself with the front and rear Railgear operating controls
- Locate Power Take-Off (PTO) toggle/switch control and indicator light, typically found on the dashboard (if equipped)
- If your truck is equipped with Railgear brakes, locate the brake switch on the dashboard of the truck

### 2.1.2 Daily Inspection

Before operating your Railgear-equipped vehicle, whether for highway or rail use, it is imperative that you perform a daily inspection – see Section 3.1.1 for Daily Inspection List. If any items found during your inspection do not conform to requirements, it is your responsibility to take corrective action before any use of the vehicle.

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## 2.2 Highway Operation

Before operating a Railgear-equipped vehicle on the highway:

1. Verify Railgear is in highway position
2. Verify that the retention systems (both front and rear) are properly engaged (even if the Railgear on your truck is equipped with a locking valve system, you MUST verify that the pins are correctly inserted)
3. Steering wheel lock has been removed (if applicable)
4. Verify that Railgear brakes have been disengaged (if applicable)
5. Verify PTO has been disengaged and that the indicator light is OFF (if applicable)

## 2.3 Getting on the Rail

**NOTE:**
**For 2011 Ford F-4/550's, there are unique guidelines for operation on rail. It is imperative to ensure that the vehicle is in 2WD & the traction control system is disengaged. Failure to do so will result in both acceleration & braking issues on rail due to overcompensation by these systems.**

### 2.3.1 Getting onto the Rail

1. At the track crossing, drive past the track, then back the vehicle onto the rails. Engaging the rear Railgear first will allow your vehicle to side-shift and align itself to the rail, making it easier to engage the front Railgear.
2. Engage the truck's parking brake to prevent the truck from rolling.

### 2.3.2 Lower Rear Guide Wheels

3. If the Railgear has brakes, turn brake switch on.
4. Engage the PTO (or auxiliary hydraulic power unit); leave the truck running and the transmission in neutral gear.
5. Disengage the Railgear retention systems (both front and rear). (If the retainers are too tight to be disengaged, verify that Railgear is fully in highway position by briefly pulling the valve handles toward you.)
6. Push valve handles to lower wheels and engage rail.
7. To assist with alignment of the wheels to the rail, you can also use the valve handles independently to lower one side at a time to engage the rail, at which point you can then lower the opposite side. This will cause your vehicle to side-shift and align itself with the rail.
8. When both wheels are fully down and properly engaging rail, re-engage safety retention systems.

### 2.3.3 Lower Front Guide Wheels

9. If necessary, drive the truck into position to line up the front guide-wheels with the rail.
10. Ensure that the PTO (or auxiliary hydraulic power unit) is engaged (this was engaged during the lowering of the rear Railgear).
11. Ensure that the front Railgear retention system is disengaged.
12. Check and make sure that the front guide wheels line up with the rail.
13. Push valve handle to lower wheels and engage rail.
14. If you do not require the use of the PTO (or auxiliary hydraulic power unit) for additional equipment, it can now be disengaged.
15. Disengage the truck's parking brake when you are ready to proceed.

**NOTE:**
**The front guide wheel assembly is an over-center design and does not require the safety Railgear retention system to be engaged in rail mode.**

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### 2.3.4 On the Tracks

- Do not exceed posted track speed limit, and at no time exceed 30 MPH while on the track.
- Be aware that some hi-rail gear is insulated, and will not operate the crossing gate circuits. You are responsible for knowing if your hi-rail equipped vehicle has insulated or non-insulated wheels. To assist in identifying insulated rail wheels, a grooved ring is machined around the inside of the front and rear driver's side wheels.
- All railroad rules and safety guidelines should be observed.
- Reduce speed while in reverse and/or at all crossings, curves, branch lines, switches and frogs (no more than a slow walking pace is recommended).
- Traction is reduced on the track, especially in wet conditions.
- Braking distance is increased on the track, especially in wet conditions.
- Do not slide tires or guide wheels on the tracks as this will cause premature wear.
- Do not exceed the maximum rated capacity of the equipment.
- On newer trucks with Anti-Lock braking systems, the amber 'ABS' dash light may remain on with the front wheels elevated. This will not reduce rear truck braking or rail wheel braking.

## 2.4 Getting off of the Rail

### 2.4.1 Removing Truck from Track

1. Safely pull onto the track crossing, paying attention to traffic and other obstacles.
2. Set the truck parking brakes and engage the PTO.
3. Leave the truck running and the transmission in neutral gear.
4. Lift both sets of Railgear (there is no preference for removal order).
5. Engage all 4 safety Railgear retention systems in highway position (passenger and driver side, for both front and rear Railgear).
6. Disengage the switch that controls the Railgear brakes (if applicable).
7. Disengage the PTO (or auxiliary hydraulic power unit) and the parking brakes.
8. Make sure surrounding area is free and clear of any obstacles and vehicles before pulling off of the rail and onto the road.
9. If the amber ABS dash light remains on during rail operation, the truck engine must be turned off and restarted after returning to highway operation. This will clear the ABS light after a few seconds. If the amber light remains on during road operation, the truck's brake system may have an active fault and should be checked out. Please refer to the truck's operation manual.

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# 3.0 ROUTINE MAINTENANCE

**3.0 Routine Maintenance**

3.1 Inspection and Maintenance
3.1.1 Daily Maintenance
3.1.2 Weekly Maintenance
3.1.3 Bi-Annual Maintenance or as required
3.1.4 Bi-Annual Maintenance or as required
3.2 Lubrication Specification
3.3 Troubleshooting
3.3.1 Troubleshooting On-track Problems
3.4 Derailment
3.5 Drawings & Illustrations
3.5.1 Grease Point Locations
3.5.2 Brake Adjustment Diagram

## 3.1 Inspection and Maintenance

If your hi-rail vehicle is high-use or operated under extreme conditions, such as operating in mountainous regions or extreme temperatures, the levels of inspections listed below may need to be performed more frequently than stated.

The following are instructions for routine inspections recommended by Diversified Metal Fabricators. In some circumstances, government or corporate regulations may require additional inspections be performed. Please ensure that you are aware of any inspection requirements that pertain to your Railgear and that you abide by all local and national laws regarding Railgear maintenance and safety.

### 3.1.1 Daily Maintenance

- Visually inspect for hydraulic fluid leaks.
- Check and make sure that all threaded fasteners are secured. NOTE: All hex nuts are either nylon insert or slotted hex nuts with cotter pins.
- Check and make sure all tie straps that secure hoses from moving parts and exhaust systems are in place. Replace if cracked or worn.
- Inspect wheel flanges for excessive wear, primarily noting differences in wear between wheels on the same axle or diagonally. If an abnormal pattern is noted, check Railgear alignment (see alignment procedure in Sections 5.1.5 and 5.1.6).
- Inspect wheel “end-play”: Placing one hand at the 9 o’clock position and your other hand at the 3 o’clock position, firmly grab the wheel and push and pull it a few times. There should be no discernable movement in and out, and the wheel should rotate freely. If you feel there is too much movement in and out, or if the wheel does not rotate freely, a detailed inspection should be performed. See Sections 5.4 & 5.5 for appropriate axle assembly drawings.
- Throughout the day, inspect wheel temperature. If extremely hot, this could indicate bearing adjustment is too tight. For adjustment information, see Section 5.4 & 5.5 for appropriate axle assembly drawings.

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### 3.1.2 Weekly Maintenance

Perform standard daily inspection points as listed above, and then check the following:

- Grease and lubricate all grease fittings on front and rear Railgear and guide wheel assemblies.

> **NOTE:**
> There are eight (8) locations on the GM/Chevy front assembly, twelve (12) on the Dodge/Ford front assembly and fourteen (14) locations on all rear assemblies. See Drawings in Sections 5.4.17 and 5.5.14 for details.

- Check level of hydraulic oil and all other fluids.
- Check air pressure in tires and inflate to proper inflation pressure (if necessary).
- Inspect brakes and adjust if necessary. Refer to Section 3.5.2
- Brake Testing
  - Operate the vehicle on a test track. With the "on/off" toggle valve "on" and the ball valve(s) open, check that:
    1. when the vehicle brake pedal is depressed, the guide wheel brakes clamp the rail wheel enough to begin slowing its rotation, but not enough to totally lock the rail wheel. The rail wheels should not be allowed to lock up since that will cause a flat spot on the wheel due to the sliding action on the rail.
    2. the brakes properly release when the brake pedal is released.
  - If brakes do not function properly, contact a Service Representative at DMF.

### 3.1.3 Bi-Annual Maintenance or as required

Perform standard daily and weekly inspection points as listed above, and then check the following:

- Remove the hubcaps from the rail wheels and inspect for deterioration or loss of wheel bearing grease. Unless there is a problem, the cavity may be topped off with the recommended grease without removing and/or re-packing the bearings. If parts appear worn or damaged, replace and repack as shown in Section 5 (5.4.13 & 5.5.8/5.5.9)
- Clean the hubcap and mating surfaces and apply a bead of silicone gasket and re-attach securely.
- Clean the strainer / filter in the hydraulic power unit tank.
- Rail test for proper traction and adjust as appropriate (see Section 5.1.5).
- Rail test for proper braking and adjust as appropriate (see Section 3.1.2).
- Check Railgear alignment (see Sections 5.1.5 and 5.1.6) .

### 3.1.4 Annual Maintenance or as required

In addition to the items listed in 3.1.1 Daily Maintenance, 3.1.2 Weekly Maintenance and 3.1.3 Bi-annual Maintenance perform the following:

- Disassemble, inspect repack and reassemble Rail Wheel Bearings as shown in Section 5 (5.4.13 & 5.5.8/5.5.9).

## 3.2 Lubrication Specification

Hydraulic Oil:

- Dexron III ATF fluid is standard for DMF supplied hydraulic power units

Wheel Bearing Grease / Grease Fittings:

- **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

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## 3.3 Troubleshooting

### 3.3.1 Troubleshooting On-track Problems

| Symptom | Possible Cause | Diagnostic Step | Corrective Action |
|---|---|---|---|
| Rail wheel vibration/ noise | Damaged Tread/Flange | Inspect treads/Flange | Replace wheel |
| | Patterned Wear on Tread/Flange | Inspect treads/Flange | Replace wheel |
| | Loose Wheel | Check wheel end play (detailed instructions at Section 5.4 & 5.5 for appropriate wheel & axle assy. drawings) | Follow detailed instructions at Section 5.4 & 5.5 |
| Vehicle tracking to one side, wandering | Misalignment | Check Alignment (see Sections 5.1.5 and 5.1.6) | Adjust Alignment |
| | Overload or load imbalance | Visually inspect, scale vehicle | Unload and/or redistribute load |
| | Un-Even Rail Wheel Load/ Vehicle Load | Weigh Vehicle and Check Rail Wheel Load | Adjust Load Distribution and Re-set Rail Wheel Load |
| | Excessive Wheel Wear | Check Alignment and Wheel Wear | Adjust Alignment, Replace Worn Wheels |
| Insufficient traction or braking | Rail Wheel Load set too low | See Section 5.1.5 | Set Rail Wheel Load |
| | Tires worn | Inspect Tires | Replace tires |
| Insufficient traction or braking in the wet | Sweeps not set properly | Inspect sweeps | Adjust sweeps |

**Table 3.3.1.A** Troubleshooting On-Track Problems

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## 3.4 Derailment

The following are instructions for derailment inspection recommended by Diversified Metal Fabricators. In some circumstances, government or corporate regulations may require additional inspections be performed. Please ensure that you are aware of any inspection requirements that pertain to your Railgear and that you abide by all local and national laws regarding Railgear maintenance and safety.

In the case of a minor derailment, the cause of the derailment should be determined and corrective steps taken. The vehicle should be inspected to determine if repairs or adjustments are required. This inspection should include, but should not be limited to, the following:

- Visually inspect Railgear for hydraulic leaks
- Ensure all lines and hoses are still secured and out of the way of any moving parts
- Ensure all hydraulic hose connections and fittings are securely in place and not broken
- Verify that all threaded fasteners are secure, and that cotter pins are not broken
- Visually inspect wheels to ensure that tread and flange are not severely damaged
- Spin all 4 railwheels, noting any bearing noise, resistance, and end play

Any items noted should be repaired using Section 4.0 and 5.0, to ensure they are repaired to initial install standards.

In case of a major derailment, a complete inspection should be performed, including but not limited to the following:

- Perform all inspection items as listed above in the Minor Derailment section
- Inspect all long arms, pivot arms, and links, to ensure they are not bent, cracked, or broken
- Inspect and test rail brake system (see Sections 3.1.2 and 3.5.2).
- Ensure spring brackets are securely fastened, and are not bent, cracked or broken
- Ensure all welds are intact and show no signs of cracking or breaking
- Ensure all mounting hardware and brackets are securely fastened, and are not bent, cracked, or damaged in any way
- A full alignment should be performed. See sections 5.1.5 and 5.1.6.
- Wheels should be removed and the bore, bearing, races, and insulation (if applicable) should be inspected for any damage. For further wheel details, see section 5.4 & 5.5 for appropriate wheel & axle assembly drawings.
- Ensure axle threads are not stripped or damaged

Any items noted should be repaired using Section 4.0 and 5.0, to ensure they are repaired to initial install standards.

Please contact DMF for any assistance you may require.

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## 3.5 Drawings & Illustrations

### 3.5.1 Grease Point Locations

See drawings in Sections 5.4.15 and 5.5.14

### 3.5.2 Brake Adjustment Diagram

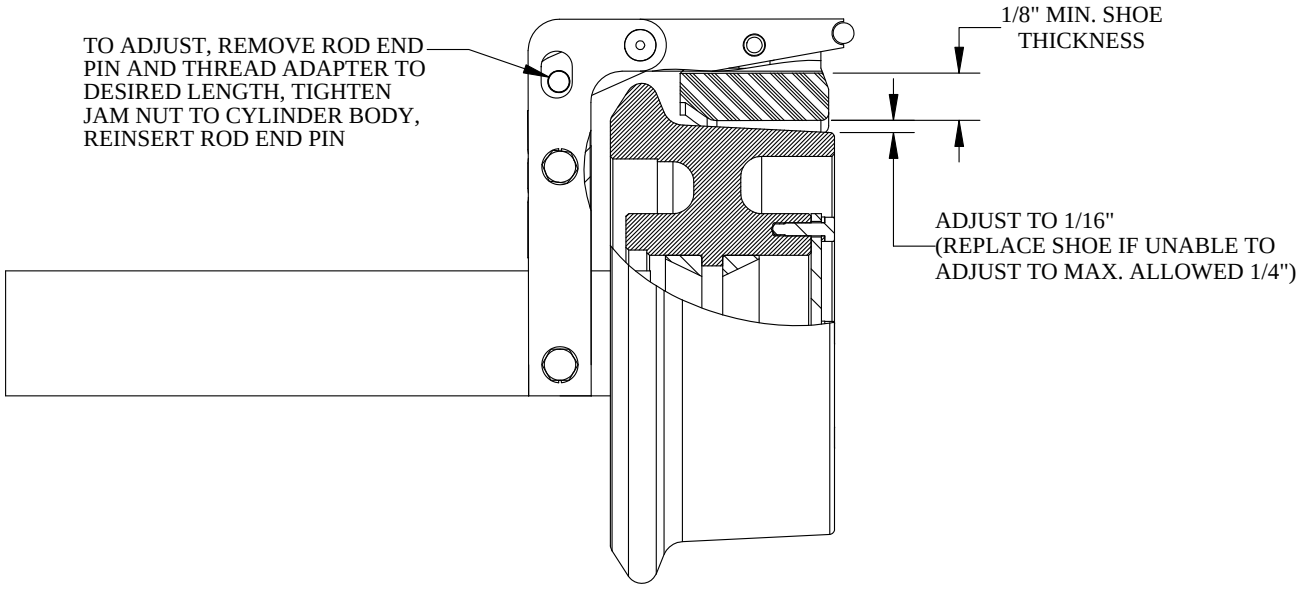
TO ADJUST, REMOVE ROD END PIN AND THREAD ADAPTER TO DESIRED LENGTH, TIGHTEN JAM NUT TO CYLINDER BODY, REINSERT ROD END PIN
1/8" MIN. SHOE THICKNESS
ADJUST TO 1/16" (REPLACE SHOE IF UNABLE TO ADJUST TO MAX. ALLOWED 1/4")

**Figure 3.5.2.A Brake Adjustment Diagram**

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# 4.0 RAILGEAR INSTALLATION

*Detailed drawings can be found in section 5.1: Installation Drawings*

**4.0 Railgear Installation**


4.1 Pre-Install
- 4.1.1 Safety Statements
- 4.1.2 Installation Order
- 4.1.3 Installation Sheets
- 4.1.4 Required Tools & Materials
- 4.1.5 Welding Information
- 4.1.6 Purchased Fastener Torque Specifications

4.2 Initial Instructions
- 4.2.1 Work Area
- 4.2.2 Truck Condition
- 4.2.3 Front and Rear Installation Rails
- 4.2.4 Installation Rails

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4.4 Installation of Rear Railgear
- 4.4.1 General Information
- 4.4.2 Diagram of Key Components
- 4.4.3 Location of Rear Railgear
- 4.4.4 Location and Clearance of Railgear
- 4.4.5 Shimming and Temporarily Spacing Rear Bracket
- 4.4.6 Square Rear Railgear with Truck Axle
- 4.4.7 Squaring up Rear Railgear to Truck Frame
- 4.4.8 Temporarily Securing Rear Bracket
- 4.4.9 Mounting Plate Installation
- 4.4.10 Welding of Spacer
- 4.4.11 Final Rear Railgear Alignment and Weight Settings

4.5 Installation of Front Railgear
- 4.5.1 General Information
- 4.5.2 Ford 4/550 Installation
- 4.5.3 Dodge/Sterling 45/5500 Installation
- 4.5.4 GM 4/5500 Installation
- 4.5.5 Installation Illustrations

4.6 Overall Alignment Procedure

4.7 Rail Test

4.8 Final Weld-out

4.9 Install Decals

4.10 Installation Review Checklist


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## 4.1 Pre-Install

**NOTE:**
The proper installation of this equipment is solely the responsibility of you, the installer. When in doubt, contact DMF for assistance.

**NOTE:**

There are currently 4 approved chassis for our 1019 series of Railgear. While very similar in some aspects, there are variances between the components and installation procedures of these chassis-specific assemblies. To address this, we have established this manual in a format giving general instructions that apply to all chassis followed by specific instructions regarding each unique variation. Where necessary, notes will be provided to ensure clarity regarding which chassis is applicable. Please locate and become familiar with the sections specific to your application.

**NOTE:**
During Railgear installation, there are 3 different alignments - front Railgear to truck frame, rear Railgear to truck frame, and a final procedure that aligns both sets of Railgear to each other.

### 4.1.1 Safety Statements

- Always block up gear before getting underneath
- Always use jack stands when jacking up vehicle
- Use personal protective equipment and clothing

### 4.1.2 Installation Order

This manual presents the installation information in the order that we find to work best. Your shop, tools, personnel or other factors may dictate a different order. This is acceptable as long as the Overall Alignment, Rail Test, Road Test and Final Inspection are performed at the end.

### 4.1.3 Installation Sheets

Refer to Section 5.0 to find the necessary installation drawings for your application. Study these drawings before proceeding through the general instructions.

### 4.1.4 Required Tools & Materials

Aside from general shop tools and safety equipment the following tools will be required:

- Arc or MIG Welder
- Surge Protector (Protects ECM from damage during welding)
- Cutting Torch
- Hand Grinder
- Frame Drill
- Air Saw
- Angle Finder
- Test Rail – See Section 4.2.3
- Shims for weight setting (ASTM A36 3/4x3x12-18"L) or Jack with gauge
- Hydraulic Oil: Dexron III ATF
- Wheel Bearing Grease / Grease Fittings: Mystik JT-6 Lo-Temp Extreme Grease (Factory Standard, preferred for colder climates), Quaker State Multipurpose Lithium EP#2, Shell Retinax LX or equal

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Additionally the following tools are recommended:

- Transmission Jack, Motorcycle Lift, Pallet Jack or Forklift
- Overhead Crane
- Work Lights
- Wheel Dolly

### 4.1.5 Welding Information

- Dual Shield Wire spec. → AWS E71T-1
- Low Hydrogen spec. → AWS E-7018

Low Hydrogen Electrodes (AWS E-7018)

| Manufacturer | Equivalent Rod |
|---|---|
| Air Products | AP-7018, 7018IP |
| Airco | 7018C, 7018-A1 |
| Arcos | Ductilend 70 |
| Air Products | 170-LA, SW-47,616 |
| Chemtron | 170-LA, SW-47,616 |
| Hobart | 718, 718-SR |
| Marquette | 7018 |
| McKay Co | 7018 |
| Reid-Avery | 7018 |
| Uniblaze | 7018 |
| Westinghouse | Wiz-18 |
| Lincoln | Jetweld LH-70 |

### 4.1.6 Purchased Fastener Torque Specifications

See drawing in Section 5.1.8

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## 4.2 Initial Instructions

### 4.2.1 Work Area

The area in which the Railgear installation is to occur should meet minimum requirements in order to facilitate the process and provide adequate conditions in which the work can be completed safely, accurately and in a timely manner.

- Floor - The floor should be level in order to provide good measurements required to check the alignment of the Railgear.
- Lighting - The work area should be adequately lighted.
- Space - There should be enough space to maneuver the Railgear components into position and to safely work around other equipment.

### 4.2.2 Truck Condition

Before installation, the truck should be checked in some important areas.

- Tires - The tire pressure should be checked for the manufacturer's recommended inflation and for consistent pressure readings from all the tires. This will ensure correct traction of the tires on the rail. Also the condition of the rear tires needs to be determined. If the rear tires are worn, they should be replaced.
- Alignment - Rear truck axle must be square with truck frame. DMF recommends that a reputable alignment shop check this. 0-degree thrust angle (which may be different than the factory specification) is required for proper Railgear operation.
- Frame & Suspension - On a new truck, these should be in good condition. On a used truck, the frame should be inspected to ensure that it has not been damaged or bent. The suspension bushings should also be examined for excessive wear and replaced if necessary. If any problems in these areas are not corrected, it will cause difficulties aligning and operating the Railgear.
- Transverse Torque Rods - On vehicles that will regularly experience high center of gravity loads on rail (e.g. spray trucks, material loaders), it is advisable to install rear tandem control rods to limit transverse axle displacement. This is also necessary on long wheelbase vehicles to prevent front tandem walking off in curves.

### 4.2.3 Front and Rear Installation Rails

In order to install the Railgear to get proper tire traction on the rail, it is necessary that standard gauge rails or Installation Rails be fabricated from 3" square tubing per Figure 4.2.4.A. Drive the truck into the work area (pulling forward and back several times to align the axles) and up onto the Rear Installation Rails. The rear inside tires should be on the rails with the rear outside tires off the floor. The Front Installation Rails are not needed at this point.

**NOTE:**
Before proceeding, be certain that the front truck tires are chocked & the parking brake is set.

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### 4.2.4 Installation Rails

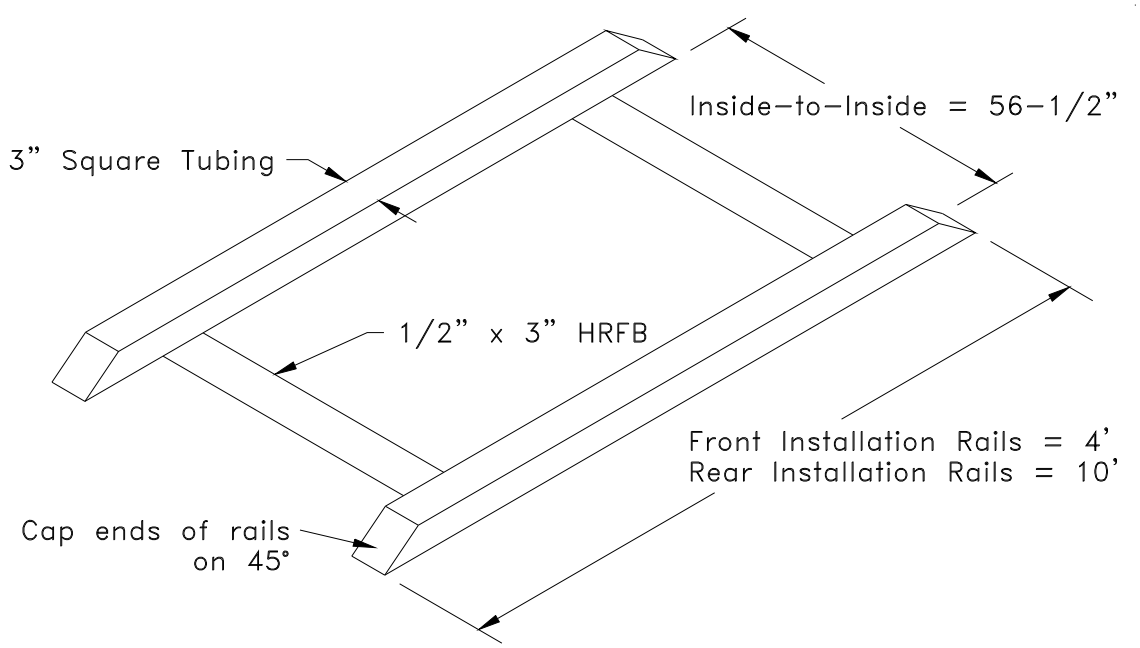


**Figure 4.2.4.A** Installation Rails

**NOTE:**
Inside-to-Inside measurement of 56-1/2" is the standard gauge for the United States. If your equipment is to be operated on any other gauge, adjust measurements according.

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## 4.3 Hydraulic System

For Hydraulic System drawings, maintenance and repair information, please see section 5.3, Hydraulic System Technical Information.

Once your new Railgear is installed, if your vehicle is going to have multiple applications for the hydraulic system, please proceed to Section 4.3.2 for instructions on installing a diverter valve.

### 4.3.1 Using Hydraulic Power Unit Provided by DMF

DMF typically provides an electric over hydraulic power unit (Monarch M-326) to power the Railgear. The unit includes a pump, motor and reservoir. This unit can be located in the truck body, under the cab, or elsewhere as required. The unit should be protected from road spray and moisture. This unit operates on Dexron III.

### 4.3.2 Hydraulic System for Multiple Uses (Railgear and other application(s))

DMF RW-1019 Railgear can be integrated with other hydraulic equipment through the use of a diverter valve. RW-1019 requires 1.25gpm at 2000psi. A suitable relief and reservoir (3gal min) must be provided. Please contact DMF for assistance in integrating Railgear with other hydraulic equipment. Due to RW-1019's use of hydraulic rail brakes, many customers avoid the extra complications of integrating by installing the provided hydraulic power unit (above) in parallel.

******WARNING******

Railgear control manifold has pressure reliefs and the hydraulic working pressure of the system is 2000 psi. The front brake relief should be set to 1800 psi. The rear brake relief should be set to 700 psi and all other parts supplied by DMF are rated to 2500 psi. Care must be exercised that the relief in any of the valves is not inadvertently exceeded. It is possible for a relief to be adjusted much higher than its valve can withstand. To ensure correct system pressure, check with a gauge.

See Section 5.3 for Hydraulic System Drawings.

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## 4.4 Installation of Rear Railgear

**NOTE:**
Only use GRADE 5 bolts when attaching rear bracket on the truck frame. The rear bracket should break away from the truck frame in an accident otherwise it will damage your truck frame.

### 4.4.1 General Information

There are several items to note before you begin the installation of the rear Railgear:

- Before you begin Railgear installation, please read installation instructions for the options you have ordered. Some options may affect the Railgear installation process.

- It is important to note that there is a difference between “shims” and “spacers”. Shims are vertical fillers, used to fill in the gaps between the truck frame and rear mounting bracket side plates. Spacers are solid steel pieces varying in thickness, used between the rear mounting bracket and the bottom of the truck frame to achieve proper weight settings between the truck tires and rail wheels while on rail.

- “Spacers” used in adjusting the height of the rear bracket must be solid steel pieces because they will experience the full structural load seen by the rear frame.

- When setting the height of the rear bracket using “spacers” you must be within the range of ½” minimum to 3” of spacers maximum. If you are outside of this range it may be necessary to change out your links. See Section 5.4.9 for different link measurements and contact DMF for final consultation before ordering a different set of links. DMF will not be responsible if the links are changed from the initial order without consulting with DMF.

- Before permanently affixing your rear bracket to the truck frame (including welding or drilling holes), be aware that during the locating, shimming (if necessary), spacing, squaring, and weight setting procedures, your rear bracket will be making slight movements during each of these steps. So you will want to only TEMPORARILY secure Railgear using clamps, chains, fork lift, etc. after each procedure.

- It is important that the truck tire pressure (especially the rear tires) be checked and brought to the tire manufacturer’s intended pressure for a given load. Reference your tire manufacturer’s load rating and inflation chart. (Inflating tires to their max side wall pressure may result in drastically reduced contact with the rail if under-loaded.)

- If the Railgear is being mounted behind an aft fuel tank, the frame may require extension. (Applies to the Ford F4/550 & Dodge 45/5500)

- The rear Railgear drops straight down, but it can articulate from side-to-side to allow alignment of the vehicle with the rail. It is important that nothing encroach upon this space (e.g., outriggers, lift-gates, and body tie-down bolts).

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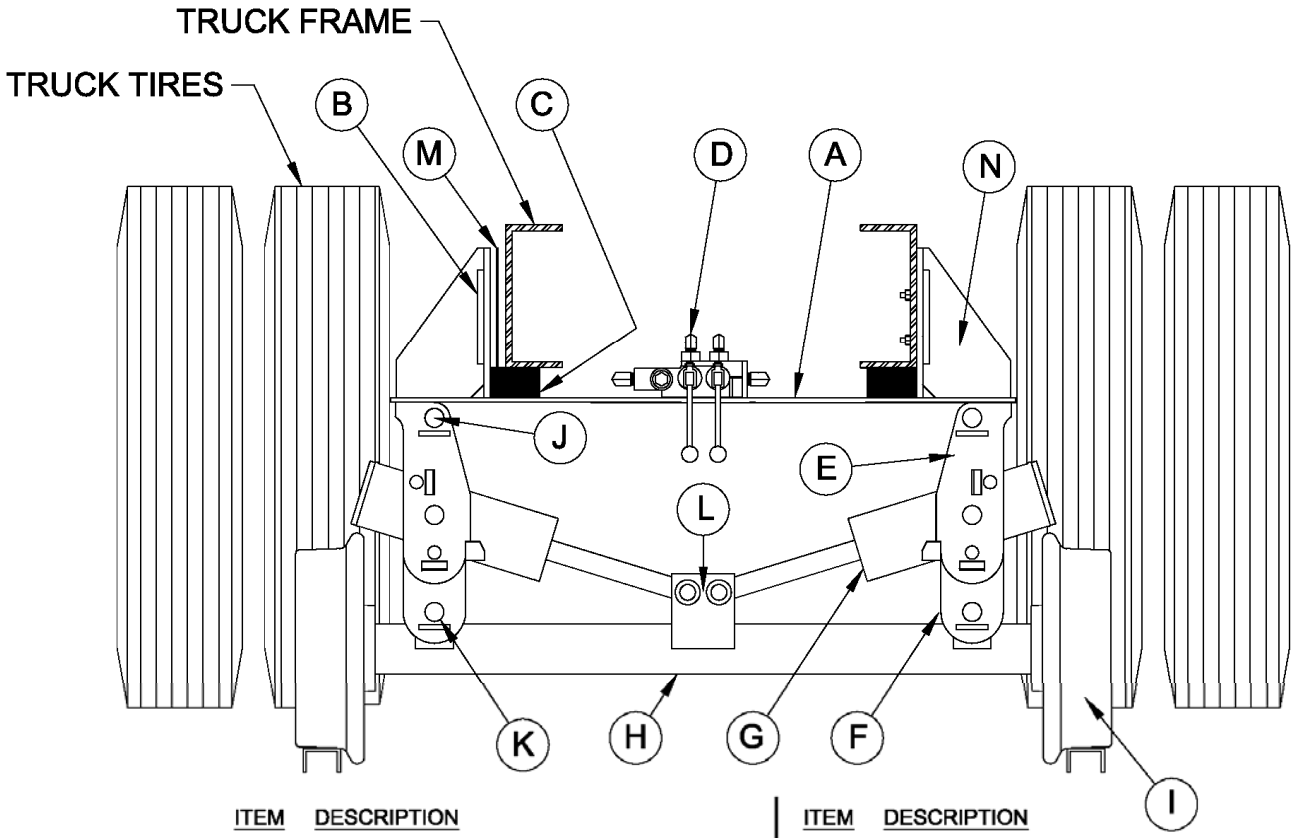
### 4.4.2 Diagram of Key Components

Figure 4.4.2.A shows the key components and terminology that will be used throughout the installation procedure.




| ITEM | DESCRIPTION |
|---|---|
| A | REAR FRAME MOUNTING BRACKET FLAT PLATE |
| B | (4) HOLE MOUNTING PLATE (INSIDE BRACKET) |
| C | SPACER (S) (IF REQUIRED) |
| D | REAR HYDRAULIC VALVE ASSEMBLY |
| E | REAR UPPER LINKS (4) |
| F | REAR LOWER LINKS (4) |
| G | REAR LIFT CYLINDERS (2) |

| ITEM | DESCRIPTION |
|---|---|
| H | REAR AXLE |
| I | REAR RAIL WHEEL |
| J | REAR UPPER MOUNTING PINS |
| K | REAR LOWER MOUNTING PINS |
| L | REAR CYLINDER PINS |
| M | REAR BRACKET SHIM(S) PLATE |
| N | SIDE PLATE |

FILENAME: M1630122

**Figure 4.4.2.A** Diagram of Key Components

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### 4.4.3 Location of Rear Railgear

Position the rear Railgear as close to the rear tires as practical (allowing clearance for mud flaps). Table 4.4.3.A gives standard location and clearance guidelines for the rear Railgear and these dimensions are shown in Section 5.1.9. Generally, leave a minimum of 2" clearance to any tire, spring, or suspension components.

| Rear Axle to Rear Railgear Center to Center Distances | Midship Fuel* | Aft Fuel | Transit Bracket |
|---|---|---|---|
| Ford F4/550 | 40.5 +/- 1" | 49.3 +/- 1" | 33.3 +/- 1" |
| Dodge/Sterling 45/5500 | 40.0 +/- 1" | 56 +/- 1" | N/A |
| GM 45/5500 | 39.0 +/- 1" | N/A | N/A |

**Table 4.4.3.A** Location of Rear Railgear

*DMF recommends the mid-mount fuel option to improve on rail performance by minimizing the distance between the Railgear and rear axle.

### 4.4.4 Location and Clearance of Railgear

The rear Railgear drops straight down, but it can articulate from side-to-side to allow alignment of the vehicle with the rail. It is important that nothing encroach upon this space (e.g., outriggers, lift-gates, and body tie-down bolts). Refer to drawing on the next page.

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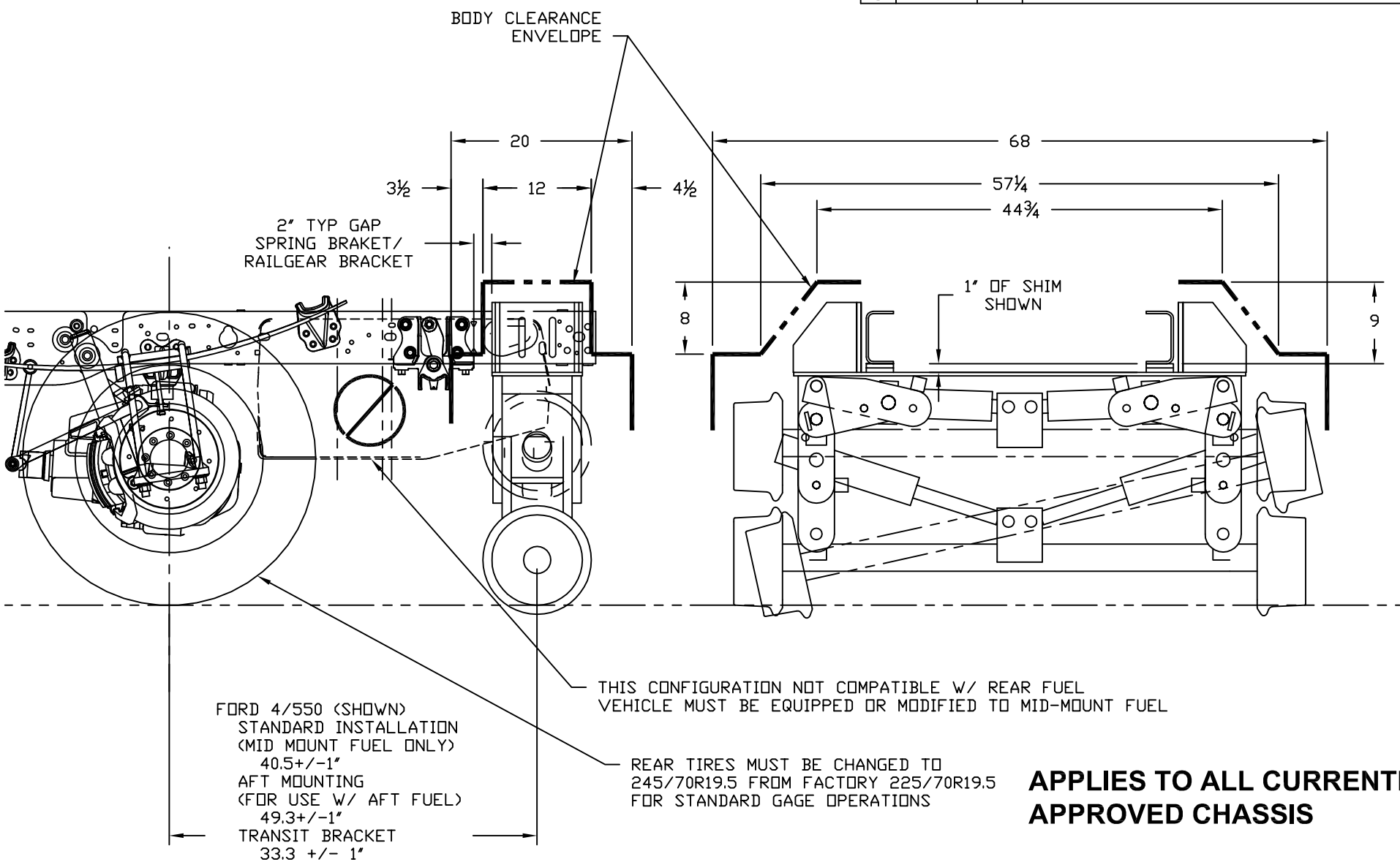
| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |




FORD 4/550 (SHOWN)
STANDARD INSTALLATION
(MID MOUNT FUEL ONLY)
40.5+/-1"
AFT MOUNTING
(FOR USE W/ AFT FUEL)
49.3+/-1"
TRANSIT BRACKET
33.3 +/- 1"
DODGE 45/5500
40.0+/-1"
AFT MOUNTING
56.0+/-1"
GM 45/5500
39.0+/-1"

**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC. MACH ± 1/32"
FRAC. OTHER ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES + .015
ANGULAR ± 1°
SURF FINISH 125 MICRO
THREADS 2A AND 2B
BREAK SHARP EDGES ( 0.030 X 45° MAX )

RW-1019

TITLE: MANUAL, RW-1019 REAR BODY CLEARANCES

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| WAK | | 12/15/09 | M1019131 | # |

### 4.4.5 Shimming and Temporarily Spacing Rear Bracket

Once Railgear is correctly located on rear frame, as above, if more than a 1/16" gap exists between the rear Railgear bracket side plate and the side of the truck frame, install equal amount of shims on each side to fill the gap, thus keeping the Railgear bracket centered. Note that DMF provides shims of different thicknesses, and it is important that the same amount of shim measurement is achieved on both sides.

With the rear bracket correctly located against bottom of frame rail and centered, there are two differing methods of setting a preliminary weight setting:

1. The first method is to measure from top of rear bracket plate to floor, and adjust bracket with temporary spacers, as shown in Table 4.4.5.A. This should provide a good starting point for final weight setting.

| | 23" | 24" | 25" | 26" | 27" | 28" | 29" | 30" |
|---|---|---|---|---|---|---|---|---|
| Xtra Short Links | 0" | 1" | 2" | 3" | | | | |
| Short Links | | | 0" | 1" | 2" | 3" | | |
| Long Links | | | | | 0" | 1" | 2" | 3" |

**Table 4.4.5.A** Shimming Chart

2. The second method is to insert the minimum (1/2") or maximum (3") of spacers, and then during the final weight setting, add or remove spacers as appropriate until optimal weight setting is achieved.

Once spacers are positioned, temporarily clamp, chain, or otherwise secure rear Railgear to truck frame. Keep in mind that spacers and rear bracket may have to be adjusted for final weight setting and squaring/aligning with the truck axle.

### 4.4.6 Square Rear Railgear with Truck Axle

The Rear Railgear needs to be made absolutely square with the rear truck axle. Four measurements (shown in Figure 4.4.7.A) need to be taken to ensure this requirement:

(1) The distance from the truck axle to the Rear Railgear Axle at each end. In Figure 4.4.7.A, distance "A" must be equal to "B" (within 1/16"). This is an important alignment check.

(2) The diagonal from the truck axle to the opposite Rear Rail Wheel. In Figure 4.4.7.A distance "C" must be equal to "D" (within 1/8").

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### 4.4.7 Squaring up Rear Railgear to Truck Frame

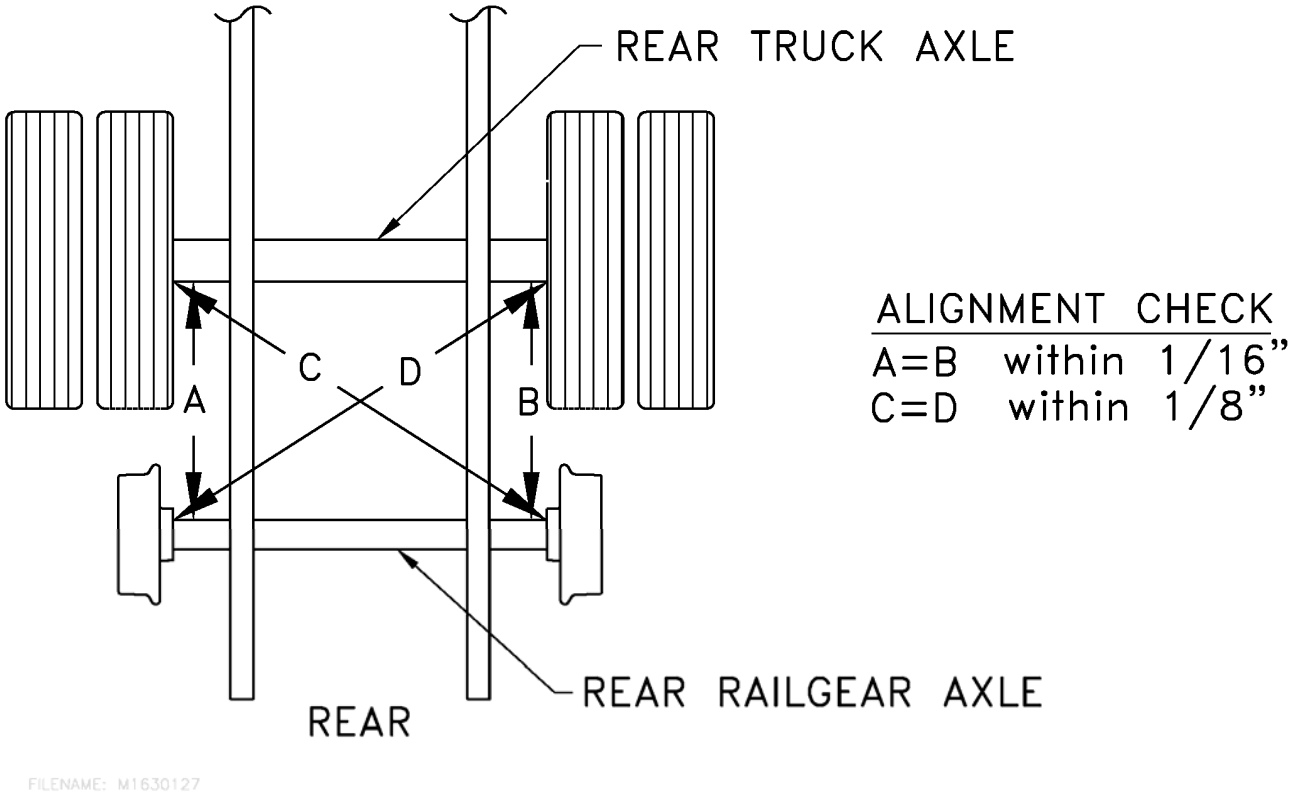


**Figure 4.4.7.A** Squaring Rear Railgear

**NOTE:**
Although the previous mounting conditions and alignment may be met, be certain that enough room exists between the Rear Railgear and other equipment. In general, this should include a 2" clearance around the Railgear (more clearance will be needed if Remote Pin-offs are installed). Also ensure that there is clearance to remove the Pin-Offs from their holes.

### 4.4.8 Temporarily Securing Rear Bracket

Now that the rear bracket is correctly centered, vertically positioned, and aligned, measure 1" up from the bottom of the slot in the rear bracket slide plate, and drill your first 5/8" hole through the shims (if applicable) and truck frame. Align this first hole with the 4-hole mounting plate, ensure that the mounting plate is level, and then drill the additional 3 holes. Once all 4 holes are drilled, install four 5/8-11 Grade-5 bolts and secure them with the appropriate washers and nylock nuts. Repeat this mounting bracket procedure for the other side of the Railgear. Temporarily tack weld the mounting plate to the rear frame bracket. If re-adjustment is later needed, the welds may be ground off, and the rear frame bracket may be slid up or down by loosening the bolts in the slots. Also, temporarily tack the spacers into place, so that if further adjustment is necessary, the welds can easily be ground off and spacers added/removed as necessary.

**NOTE:**
Only use Grade 5 bolts on rear Railgear.

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### 4.4.9 Mounting Plate Installation

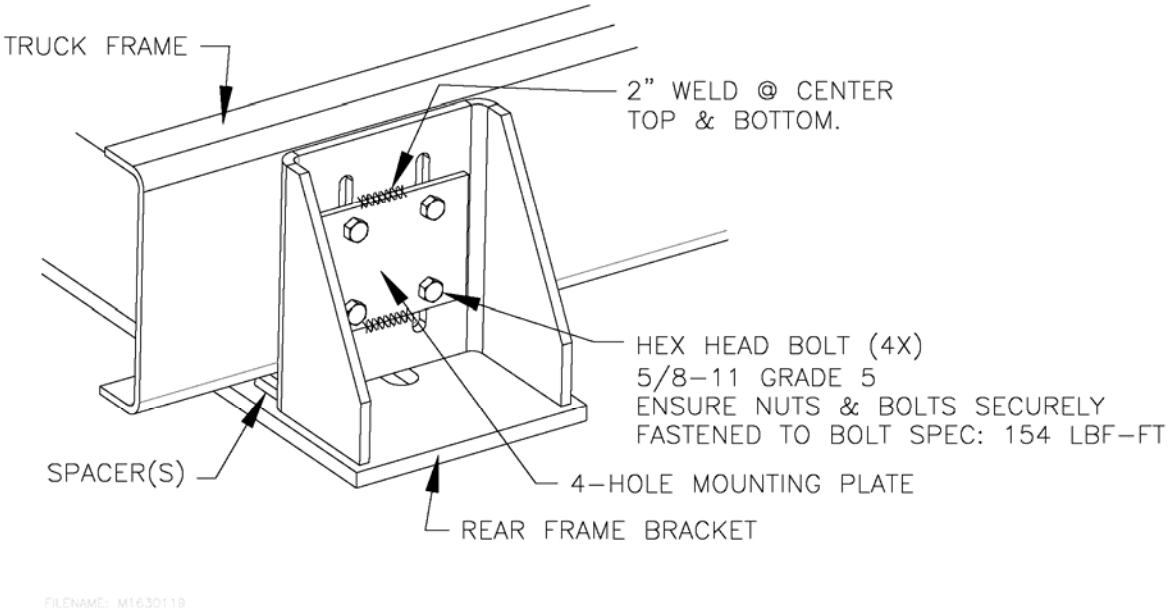


**Figure 4.4.9.A** Mounting Plate Installation

### 4.4.10 Welding of Spacer

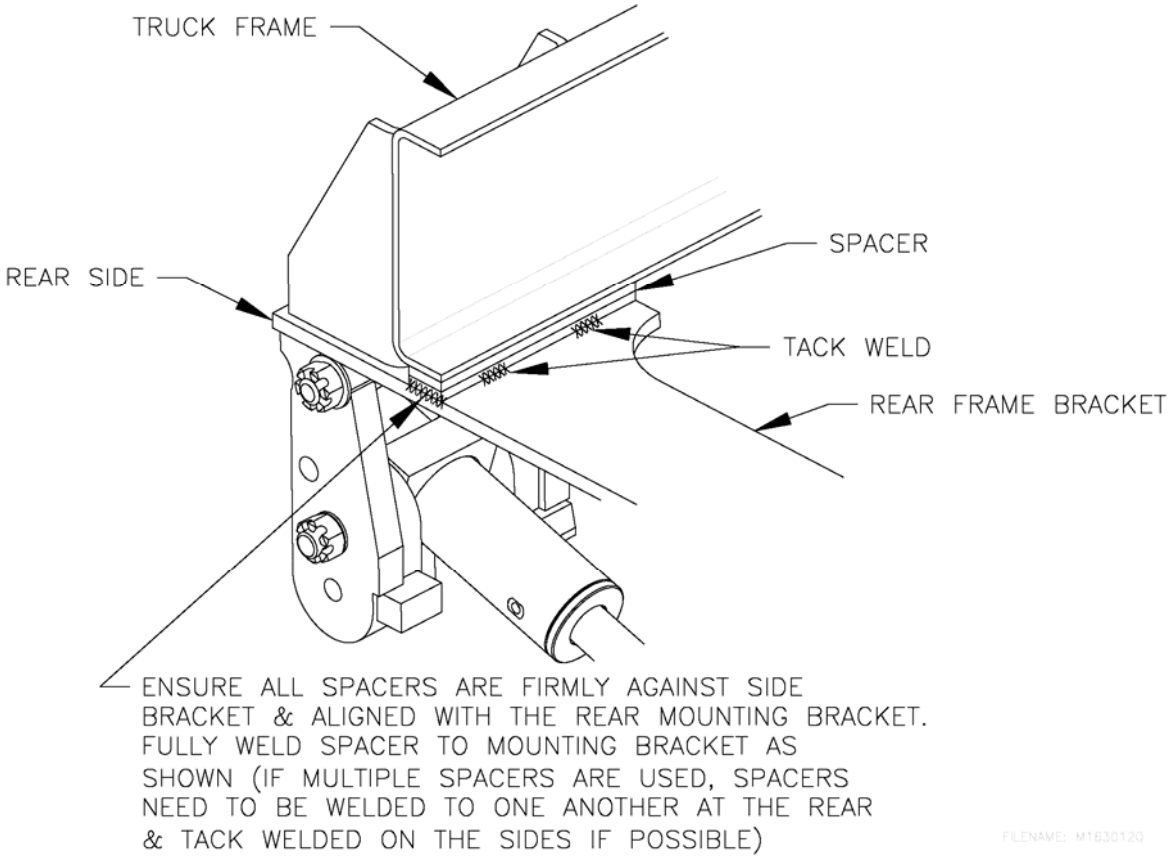
TRUCK FRAME
REAR SIDE
SPACER
TACK WELD
REAR FRAME BRACKET
ENSURE ALL SPACERS ARE FIRMLY AGAINST SIDE
BRACKET & ALIGNED WITH THE REAR MOUNTING BRACKET.
FULLY WELD SPACER TO MOUNTING BRACKET AS
SHOWN (IF MULTIPLE SPACERS ARE USED, SPACERS
NEED TO BE WELDED TO ONE ANOTHER AT THE REAR
& TACK WELDED ON THE SIDES IF POSSIBLE)

**Figure 4.4.10.A** Welding of Spacer

### 4.4.11 Final Rear Railgear Alignment and Weight Settings

Rear Railgear alignment and weight settings can only be performed after front Railgear is installed. The procedures for these final steps can be found in Section 4.6.

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## 4.5 Installation of Front Railgear

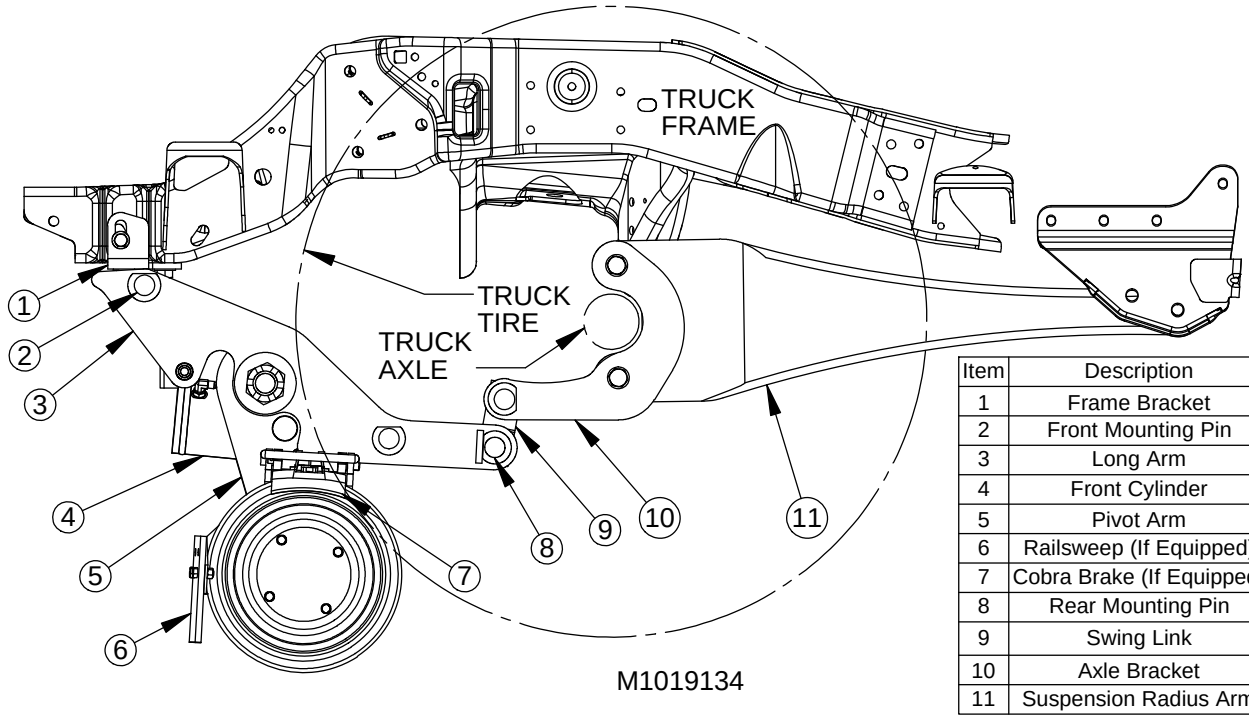
### 4.5.1 General Information

There are several items to note before you begin the installation of the front Railgear:

- The Railgear unit that we have shipped to you has been designed for your specific truck.
- Installation instructions vary depending on chassis type. Prior to beginning front installation, please locate and become familiar with the section specific to your application.
- Check for sufficient clearances to prevent interference with Railgear and other parts of the truck (i.e. Frame, steering boxes, shocks, oil filters, etc.) See section 4.5.5 for complete Clearance Note.
- In normal applications, mount the Front Valve Plate Assembly between the Frame Extensions (with the Energy Valve on the underside and the handle facing forward) and weld in place. If this is not possible, mount Valve Assembly in the most appropriate and easily accessible location.

### 4.5.2 Ford 4/550 Installation

Figure 4.5.2.A shows the individual parts of the installed front Railgear. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.




| Item | Description |
|---|---|
| 1 | Frame Bracket |
| 2 | Front Mounting Pin |
| 3 | Long Arm |
| 4 | Front Cylinder |
| 5 | Pivot Arm |
| 6 | Railsweep (If Equipped) |
| 7 | Cobra Brake (If Equipped) |
| 8 | Rear Mounting Pin |
| 9 | Swing Link |
| 10 | Axle Bracket |
| 11 | Suspension Radius Arm |

**Figure 4.5.2.A** '08- Present Ford 45/550 Front Railgear - Key Components

Refer to drawing in Section 5.1.2 for additional installation guidelines

Mounting Axle Brackets:

1. Raise vehicle and support with jack stands
2. Remove front wheels and tires
3. Disconnect lower shock mount to allow clearance
4. Support the Radius Arm with a jack stand or other means
5. Remove the Radius Arm mounting bolts and nuts (Note: the upper passenger side nut is tack welded to arm. Grind to remove.)

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6. Install axle brackets with provided M18 nuts and bolts. Be sure that the axle bracket with a pin stop is to the outboard side of the vehicle.
7. Re-attach lower shock mount
8. Re-install wheels and tires
9. Remove jack stands and lower truck

Mounting Frame Brackets:

1. Remove front bumper (refer to chassis manufacturer's manual)
2. Bolt brackets in position through the existing slot in the sidewall of the frame rail
3. Leave fasteners loose to allow movement during alignment procedures

**NOTE:**
Do not match drill vertical holes in bottom of frame brackets at this point. These fasteners will be installed after a rough overall alignment has been completed. This allows for the necessary adjustment to achieve proper alignment.

Install Railgear

1. Slide Railgear under truck
2. Attach front of long arms to the frame brackets using the provided front pins
3. Attach rear of long arms to the axle brackets using the provided rear pins

Route Hydraulic lines

1. Route Railgear hydraulic lines following the schematic in Section 5.3.2
2. Route brake hydraulic lines following the schematic in Section 5.3.2. Also, pay close attention to the specific routing shown in Section 5.3.6.

Align Front Railgear

1. Ensure that the long arms are parallel with each other and the truck frame
   - The outside Long Arms should be the same distance apart at the Rear Mounting Pin as they are at the Front Mounting Pin. This prevents the mechanism from binding during highway/rail operation of the Railgear. Also, the distance from the outboard side of the frame rail to the outside face of the Long Arm should be the same on each side.
2. Ensure that the Front Mounting Pins are the same distance forward
   - Measure the Frame Brackets back to a common point on the chassis. These dimensions should not vary more than 1/16".
3. Check placement of Axle Brackets
   - As the Axle Brackets are attached directly to a common point on the suspension, these components should be in the proper location. Verify that this is the case and that the Axle Brackets are parallel to each other. If not, loosen the mounting bolts and correct the misalignment.
4. Secure Frame Brackets
   - After performing the above alignment checks and ensuring there are sufficient clearances for the Railgear, you may now match drill the vertical holes in the Front Frame Brackets and fully secure the brackets to the frame.
5. Align Axle and orient Brakes
   - Raise the front Rail Wheels just above the floor, enough to slide the front Installation Rails into place under the Rail Wheels. Because the Railgear Axle assembly is not fixed to the Pivot Arms (outside pivot arms will be completely welded to axle on inboard side at final weld-out), the Rail Wheels need to be centered. To center, measure the distance from the inside of the Rail Wheel to the truck frame. If the measurements are off, slide the Rail Wheels and Axle assembly to one side (the Axle Tube will slide through the holes in the Pivot Arms).

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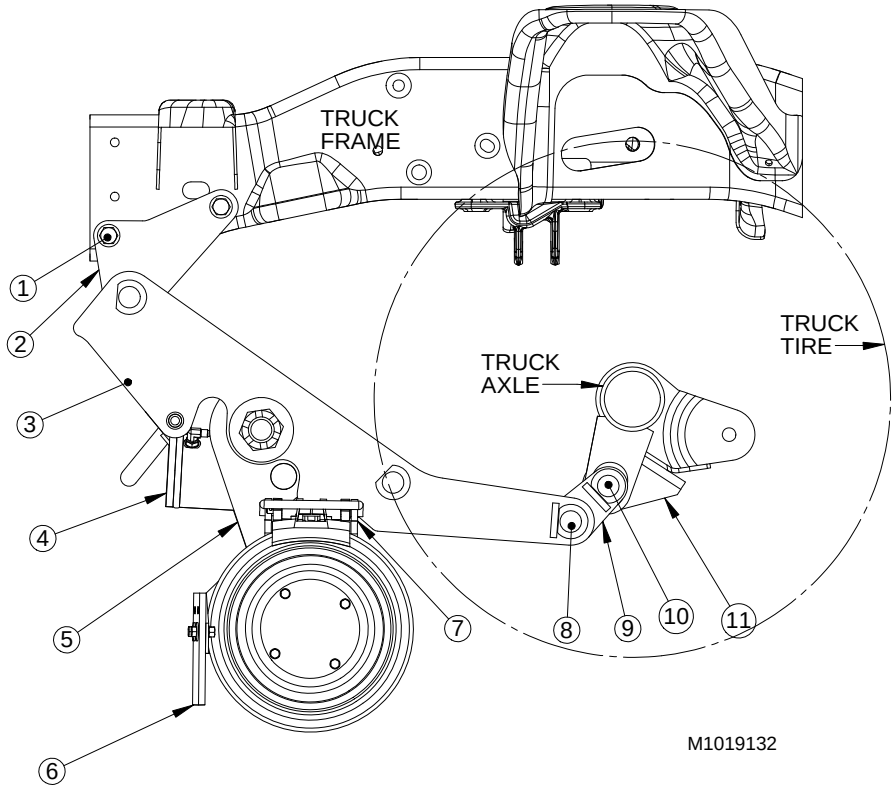
- The Cobra Brakes need to be rotated so that they are oriented in the correct position (see Figure 4.5.5.A). See Section 5.4.16 for an exploded diagram of the brake assembly.
- With the Axle Tubes now centered and brake configuration determined, the Axle Tubes should be temporarily tacked to the inboard side of the outside pivot arm (at final adjustment, the tacks can be ground off and the axle re-adjusted if necessary). The inside Pivot Arms should not be welded to the Axle Tube to facilitate ease of disassembly for repair or future maintenance. The front Railgear is ready to be lowered on the Installation Rails. As the Railgear is lowered, check the clearance from the truck tire to the Rail Wheels. (If there is any interference, stop lowering the wheels, and retrace the installation steps to fix the problem.) When the Railgear is completely lowered, the front truck tires should be approximately 2 inches above the Installation Rails. If Railgear will not lift the truck, check that the cylinders are not cross plumbed, that the system pressure relief valve (if present) is set high enough and that the pressure relief on the Front Railgear Valve is set high enough. As a final review, recheck the center alignment of the Rail Wheels to the truck frame. (If it is off, break the tacks between the outside Pivot Arms and Axle Tube and slide the Axle Tube to the correct position and re-tack in place.)

### 4.5.3 Dodge/Sterling 45/5500 Installation

Figure 4.5.3.A shows the individual parts of the installed front Railgear. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.




| ITEM | DESCRIPTION |
|---|---|
| 1 | FRONT MOUNTING PIN |
| 2 | FRAME BRACKET |
| 3 | LONG ARM |
| 4 | FRONT CYLINDER |
| 5 | PIVOT ARM |
| 6 | RAILSWEEP (IF EQUIPPED) |
| 7 | COBRA BRAKE (IF EQUIPPED) |
| 8 | REAR MOUNTING PIN |
| 9 | SWING LINK |
| 10 | SWING LINK PIN |
| 11 | AXLE BRACKET |

**Figure 4.5.3.A** '08- Present Dodge/Sterling 45/5500 Front Railgear - Key Components

Refer to drawing in Section 5.1.3 for additional installation guidelines

Mounting Axle Brackets:

1. Raise vehicle and support with jack stands

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2. Remove front wheels and tires
3. Align formed axle bracket with weldment on chassis axle
4. Match drill holes through axle bracket and bolt in place
5. Position cross tube and bracket side plates as shown on drawing (Note: these will be welded to the axle bracket after completion of final alignment)

Mounting Frame Brackets:

1. Remove front bumper (refer to chassis manufacturer's manual)
2. Remove factory installed front tow eyes (if applicable)
3. Bolt frame brackets to rail as shown on drawing using existing holes in frame
4. Install cross tube (Note: the cross tube will be welded in place after final alignment and weight settings)

Install Railgear

1. Slide Railgear under truck
2. Attach front of long arms to the frame brackets using the provided front pins
3. Attach rear of long arms to the axle brackets using the provided rear pins

Route Hydraulic lines

1. Route Railgear hydraulic lines following the schematic in Section 5.3.2
2. Route brake hydraulic lines following the schematic in Section 5.3.2. Also, pay close attention to the specific routing shown in Section 5.3.6.

Align Front Railgear

1. Ensure that the long arms are parallel with each other and the truck frame
   - The outside Long Arms should be the same distance apart at the Rear Mounting Pin as they are at the Front Mounting Pin. This prevents the mechanism from binding during highway/rail operation of the Railgear. Also, the distance from the outboard side of the frame rail to the outside face of the Long Arm should be the same on each side.
2. Check placement of Frame Brackets
   - Measure the Frame Brackets back to a common point on the chassis. These dimensions should not vary more than 1/16". After achieving this tolerance, snug the mounting bolts to hold the position of the brackets.
3. Check placement of Axle Brackets
   - As the Axle Brackets are attached directly to a common point on the suspension, these components should be in the proper location. Verify that this is the case and that the Axle Brackets are parallel to each other. If not, loosen the mounting bolts and correct the misalignment.
4. Secure Frame Brackets
   - After performing the above alignment checks and ensuring there are sufficient clearances for the Railgear, you may now tighten the Frame Bracket mounting bolts.
5. Align Axle and orient Brakes
   - Raise the front Rail Wheels just above the floor, enough to slide the front Installation Rails into place under the Rail Wheels. Because the Railgear Axle assembly is not fixed to the Pivot Arms (outside pivot arms will be completely welded to axle on inboard side at final weld-out), the Rail Wheels need to be centered. To center, measure the distance from the inside of the Rail Wheel to the truck frame. If the measurements are off, slide the Rail Wheels and Axle assembly to one side (the Axle Tube will slide through the holes in the Pivot Arms).
   - The Cobra Brakes need to be rotated so that they are oriented in the correct position (see Figure 4.5.5.A). See Section 5.4.16 for an exploded diagram of the brake assembly.
   - With the Axle Tubes now centered and brake configuration determined, the Axle Tubes should be temporarily tacked to the inboard side of the outside pivot arm (at

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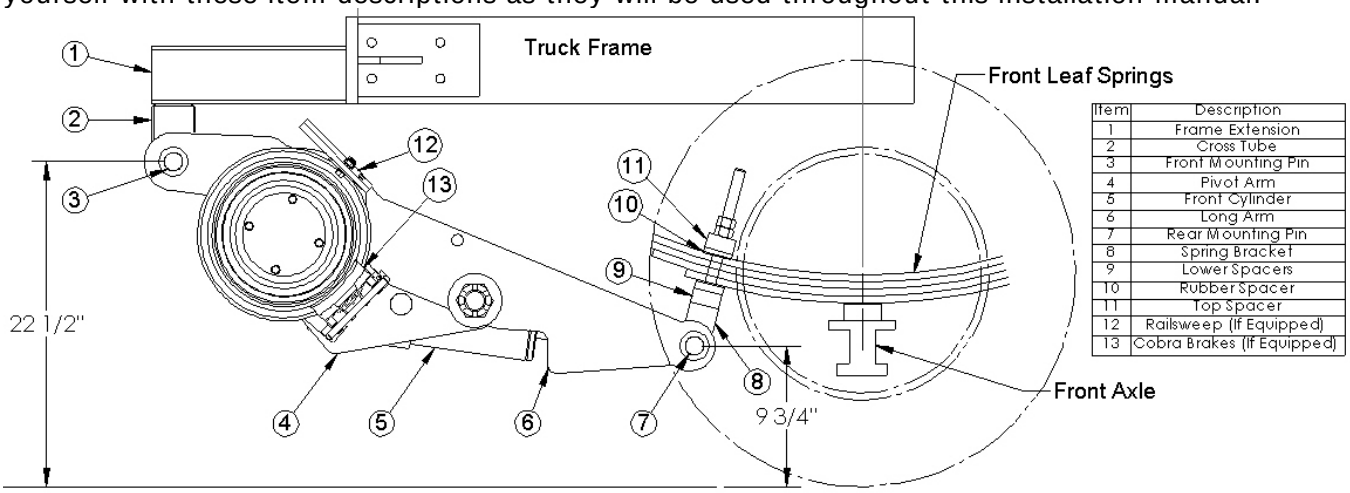
final adjustment, the tacks can be ground off and the axle re-adjusted if necessary). The inside Pivot Arms should not be welded to the Axle Tube to facilitate ease of disassembly for repair or future maintenance. The front Railgear is ready to be lowered on the Installation Rails. As the Railgear is lowered, check the clearance from the truck tire to the Rail Wheels. (If there is any interference, stop lowering the wheels, and retrace the installation steps to fix the problem.) When the Railgear is completely lowered, the front truck tires should be approximately 2 inches above the Installation Rails. If Railgear will not lift the truck, check that the cylinders are not cross plumbed, that the system pressure relief valve (if present) is set high enough and that the pressure relief on the Front Railgear Valve is set high enough. As a final review, recheck the center alignment of the Rail Wheels to the truck frame. (If it is off, break the tacks between the outside Pivot Arms and Axle Tube and slide the Axle Tube to the correct position and re-tack in place.)

### 4.5.4 GM 4/5500 Installation

Figure 4.5.4.A shows the individual parts of the installed front Railgear. Please familiarize yourself with these item descriptions as they will be used throughout this installation manual.




| Item | Description |
|---|---|
| 1 | Frame Extension |
| 2 | Cross Tube |
| 3 | Front Mounting Pin |
| 4 | Pivot Arm |
| 5 | Front Cylinder |
| 6 | Long Arm |
| 7 | Rear Mounting Pin |
| 8 | Spring Bracket |
| 9 | Lower Spacers |
| 10 | Rubber Spacer |
| 11 | Top Spacer |
| 12 | Railsweep (If Equipped) |
| 13 | Cobra Brakes (If Equipped) |

**Figure 4.5.4.A** '02- 09 GM 45/5500 Front Railgear - Key Components

Refer to drawing in Section 5.1.4 for additional installation guidelines

**NOTE:**
DMF front frame extensions are designed to support the Railgear only. It is the installer's responsibility to properly engineer brackets for rail racks, boom rests and etc.

Mounting spring bracket hangers:

1. Remove the truck's front bumper.
2. Bolt the Frame Extensions to the truck frame. Make sure that the tilt of the cab's hood will clear the Frame Extensions. Trim the brackets and re-gusset them if necessary. All truck Frame Extensions that are bolt-on brackets must use 5/8" Gr. 8 bolts, hardened steel washers and Gr. 8 prevailing torque locknuts. All of the 5/8 Gr. 8 fasteners should be tightened per SAE torque specs. Check that the Frame Extension tubes are level front to rear and side to side with the frame.
3. Slide the front Railgear under the truck frame, positioning the spring bracket hangers as close as possible to the front truck axle. Make sure at least half of the spacer is seated on the leaf spring closest to the front truck axle. If the spacer is not at least half-seated, move spring bracket hanger forward to next leaf spring.

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4. Once positioned, place a floor jack under the outboard and inboard long arm, close to the spring hanger on the driver's side. Using the jack, raise the spring hanger up toward the truck's leaf springs. You will raise and lower the long arms until the "Rear Mounting Pin" is 9-3/4" (+/- ½") from the floor. See figure 4.5.4.A.
5. Once you achieve the desired height, insert 1"x2" flat bar spacers between spring hanger and leaf spring, up to a maximum of 4". If you need more than 4" of spacers, a change of spring brackets may be required (see section 5.5.12 for spring bracket information). Contact DMF for assistance.
6. Once spacers are in place with spring bracket at the appropriate height, attach the Spring Bracket to the truck spring using a Rubber Spacer (already supplied) directly on top of the leaf springs, and then a 1" x 2" flat bar Spacer (already supplied) on top of the Rubber Spacer and two 3/4"-10 hex nuts per stud. The top Spacer has no effect on the height of the Railgear and is only used for clamping purposes.
7. The nuts should be tightened down until the Rubber Spacer begins to deform from the downward pressure (**Caution: Do not over tighten**).
8. Repeat process on passenger side.

Route Hydraulic lines

1. Route Railgear hydraulic lines following the schematic in Section 5.3.2
2. Route brake hydraulic lines following the schematic in Section 5.3.2. Also, pay close attention to the specific routing shown in Section 5.3.6.

Mounting Front Cross Tubes:

1. Ensure that both spring bracket hangers are properly installed before attempting to install front cross tubes.
2. Connect hydraulic system to Railgear.
3. Disengage the front Railgear retention system and set the steering tires straight ahead. The front Railgear can now be actuated with the hydraulic system, which will cause the Long Arms to be raised up to the Frame (see Figure 4.5.4.A). The Frame Mounting Bracket only needs to be brought up to where it touches the Frame Extension or truck frame (not raised all the way to lift the truck frame and raise the truck tires).
4. In order to install the front of the front Railgear at the correct height, the center of the Front Mounting Pins must be located at 22-1/2" (+/- ½") from the ground (with the truck tires on the ground) as shown in Figure 4.5.4.A. If required, space the cross tubes down to obtain this 22-1/2" up to a maximum of 3" of spacers. Any spacers used should be load bearing members (no thin wall tubing). If you need more than 3" of shims, a change of cross tubes / mounting block may be required (see section 5.5.11 for information). Contact DMF for assistance.
5. Once properly shimmed, the hydraulic system should already be properly positioned to hold the shims in place until alignment can be completed.
6. Check for truck frame, spring, steering gear or other truck component interference with the Railgear (particularly the Long Arms - see CLEARANCE NOTE in section 4.5.5).
7. Repeat process on passenger side.

Align Front Railgear

1. Ensure that the long arms are parallel with each other and the truck frame
   - The outside Long Arms should be the same distance apart at the Rear Mounting Pin as they are at the Front Mounting Pin. This prevents the mechanism from binding during highway/rail operation of the Railgear. Also, the distance from the outboard side of the frame rail to the outside face of the Long Arm should be the same on each side.
2. Check placement of Front Cross Tubes
   - Measure the Frame Brackets back to a common point on the chassis. These dimensions should not vary more than 1/16". After achieving this tolerance, snug the mounting bolts to hold the position of the brackets.

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3. Check placement of Spring Bracket
   - Measure the distance from each Spring Bracket (or axle bracket) back to the truck axle. Since the forward position of the Long Arms has been verified (Check #2), an off measurement here probably means the front truck axle is misaligned and needs to be corrected.
4. Secure Front Cross Tubes
   - After performing the above alignment checks and ensuring there are sufficient clearances for the Railgear, you may now tack the Cross tubes to the Front Frame Extensions.
5. Align Axle and orient Brakes
   - Raise the front Rail Wheels just above the floor, enough to slide the front Installation Rails into place under the Rail Wheels. Because the Railgear Axle assembly is not fixed to the Pivot Arms (outside pivot arms will be completely welded to axle on inboard side at final weld-out), the Rail Wheels need to be centered. To center, measure the distance from the inside of the Rail Wheel to the truck frame. If the measurements are off, slide the Rail Wheels and Axle assembly to one side (the Axle Tube will slide through the holes in the Pivot Arms).
   - The Cobra Brakes need to be rotated so that they are oriented in the correct position (see Figure 4.5.5.A). See Section 5.4.16 for an exploded diagram of the brake assembly.
   - With the Axle Tubes now centered and brake configuration determined, the Axle Tubes should be temporarily tacked to the inboard side of the outside pivot arm (at final adjustment, the tacks can be ground off and the axle re-adjusted if necessary). The inside Pivot Arms should not be welded to the Axle Tube to facilitate ease of disassembly for repair or future maintenance. The front Railgear is ready to be lowered on the Installation Rails. As the Railgear is lowered, check the clearance from the truck tire to the Rail Wheels. (If there is any interference, stop lowering the wheels, and retrace the installation steps to fix the problem.) When the Railgear is completely lowered, the front truck tires should be approximately 2 inches above the Installation Rails. If Railgear will not lift the truck, check that the cylinders are not cross plumbed, that the system pressure relief valve (if present) is set high enough and that the pressure relief on the Front Railgear Valve is set high enough. As a final review, recheck the center alignment of the Rail Wheels to the truck frame. (If it is off, break the tacks between the outside Pivot Arms and Axle Tube and slide the Axle Tube to the correct position and re-tack in place.)
6. Completing Front Installation
   - If the Spring Bracket location had to be adjusted, make sure that the hex nuts (two per stud) on both Spring Brackets have been tightened down. Then with a torch, cut the excess stud length on the Spring Brackets. If these studs are not trimmed down, they may pose a clearance problem with other parts on the truck (see CLEARANCE NOTE and Figure 4.5.5).

**NOTE:**
Remount the truck front bumper or use 8" standard channel welded onto the ends of the Frame Extensions.

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### 4.5.5 Installation Illustrations

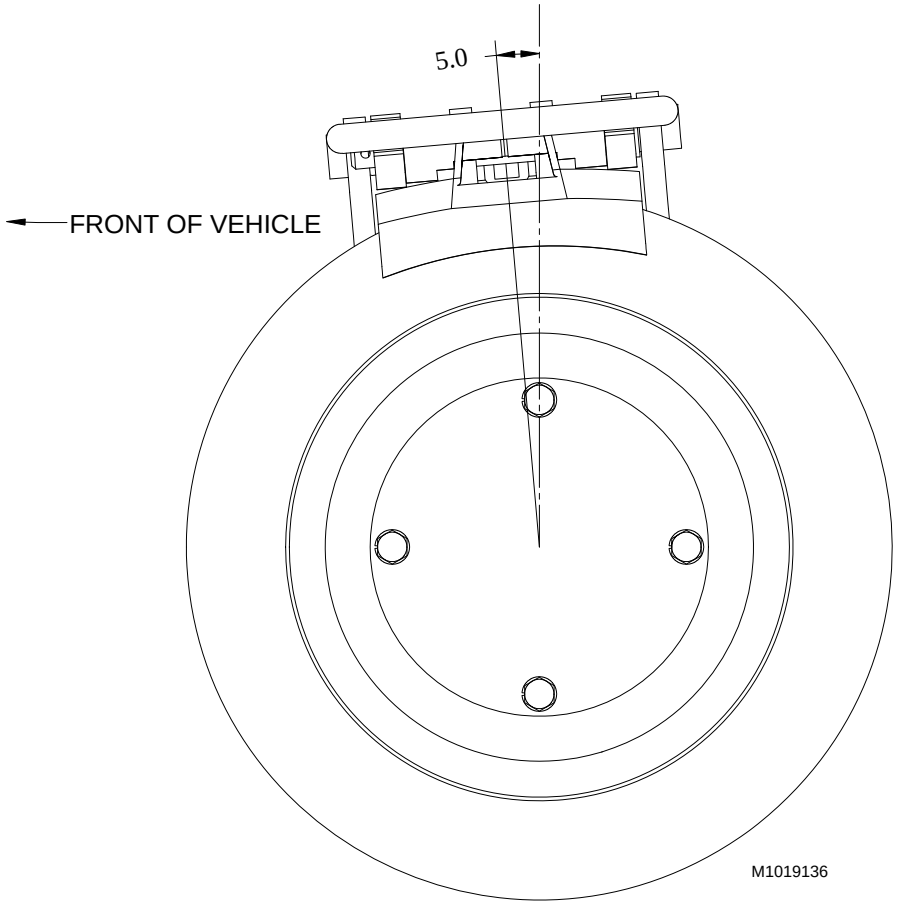


**Figure 4.5.5.A** Cobra Brake Orientation

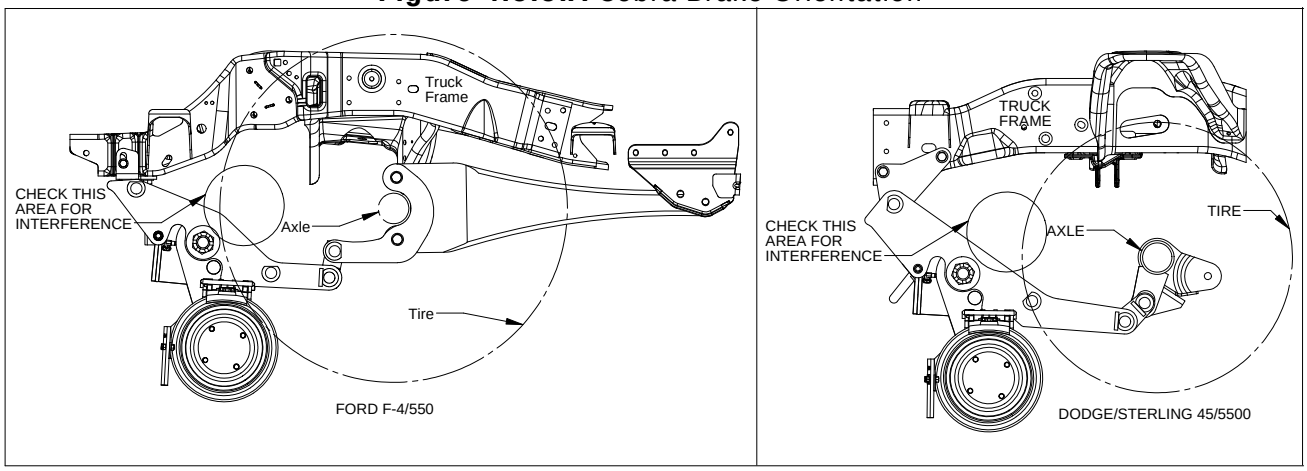


**Figure 4.5.5.B** Ford F-4/550 & Dodge/Sterling 45/5500 Clearance Envelope

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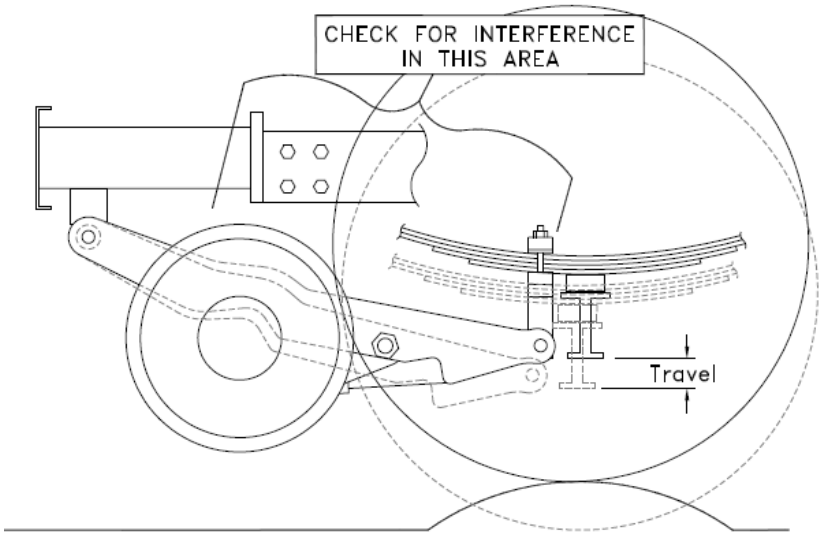


**Figure 4.5.5.C** GM 45/5500 Clearance Envelope

**CLEARANCE NOTES**

Proper clearances will allow the Railgear to move up and down with the truck front suspension. As the truck tire hits bumps in the road, the truck spring allows the front axle to move upward (see above figure relevant to your chassis). Since the Railgear is attached to the spring just in front of the axle, sufficient clearance must be allowed to prevent interference with other parts on the truck (i.e. frame, steering linkages or boxes, shocks, oil filters, spring hangers, hydraulic lines, etc.). The Front Mounting Pin does not move in relation to the vehicle frame because it is fastened through the Frame Extension (or directly to the truck frame). As the Front Mounting Pin does not move and the Rear Mounting Pin (at the axle) does, the Railgear effectively rotates about the Front Mounting Pin. Therefore, the part of the Railgear near the Rear Mounting Pin moves more than the part near the Front Mounting Pin, and attention needs to be paid to the possible clearance problems that can be caused by this movement.

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## 4.6 Overall Alignment Procedure

With the front and rear Railgear both installed and each squared individually to the truck frame, you must perform a final overall alignment of front to rear Railgear, and also adjust the weight setting.

See sections 5.1.5 and 5.1.6 for alignment and weight drawings. Once you have completed the alignment procedure, return to Section 4.7 for continued installation instructions.

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## 4.7 Rail Test

- Run vehicle forwards and backwards on rail.
- If available, run the vehicle through curves and switches.
- Verify alignment by observing the wear pattern on the wheel and the behavior of the vehicle. If adjustment is required refer to section 4.6 Overall Alignment Procedure.

## 4.8 Final Weld-out

Front Railgear:

- Weld inboard side of outside pivot arm to axle tube all the way around.
- Fully weld, on all sides, front mounting blocks / cross tubes to truck frame.
- If shims were required, fully weld shims into place on all sides for each shim location.

Rear Railgear:

- Weld 4-hole mounting plate to rear frame bracket as shown in section 5.1.1.
- Ensure all spacers are firmly against side bracket and aligned with the rear mounting bracket, then fully weld spacer to mounting bracket as shown in section 5.1.1.
- If multiple spacers are used, spacers must be fully welded to one another on the rear, and tack welded on the sides, as shown in section 5.1.1.

## 4.9 Install Decals

- Label the vehicle according to the diagram on the back of the decal sheet. See decal drawings in section 5.1.7.

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## 4.10 Installation Review Checklist

The following checklist is intended to assist the installer in re-checking and verifying aspects of the installation that are often overlooked or forgotten.

- ❑ Rail test the truck to check for good traction and braking. A good industrial siding or some authorized track time will be required. Check that rail wheels with brakes do not lock-up or slide.
- ❑ Adjust the Railgear height as required.
- ❑ Re-check alignment of the Rear Railgear to the rear axle.
- ❑ Weld the Mounting Plate to the Rear Frame Bracket with two 2" welds (at the top center and bottom center). Welding the plates must be done; DO NOT forget to do it.
- ❑ Double check all welds and fasteners, and mounting cotter pins. Tie strap all hydraulic hoses, air hoses, and electrical wires away from exhausts and moving parts. Ensure that all hydraulic and air hoses have sufficient radius at bends.
- ❑ Top off the hydraulic oil in the tank.
- ❑ Verify grease installed at all grease fittings per diagrams in Sections 5.4.15 & 5.5.14
- ❑ Touch-up the black acrylic enamel paint on the Front and Rear Railgear.
- ❑ Raise the Railgear (highway position) and install all optional retention systems.
- ❑ Apply the Decal Kit.
- ❑ Check tire pressures.
- ❑ Check Front Alignment per Sections 5.1.5 and 5.1.6
- ❑ Check Rear Alignment per Sections 5.1.5 and 5.1.6
- ❑ Check overall measurements:
  - o Rear Truck Axle to Rear Railgear Axle (straight): A = B (within 1/16")
  - o Rear Truck Axle to Rear Railgear Axle (diagonal): C = D (within 1/8")
  - o Front Railgear to Rear Railgear (straight): E = F (within 1/8")
  - o Front Railgear to Rear Railgear (diagonal): G = H (within 1/4")
- ❑ Raise and lower Railgear and verify retention system operation at highway and rail positions
- ❑ Verify that all bodywork is replaced and secure.
- ❑ In a parking lot or open area, verify that the tires, rims or Railgear do not contact the frame, suspension or other items.
- ❑ Inspect brake lines and ABS sensor lines to verify clearance from rim.
- ❑ Check for any rattles and vibration.

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# 5.0 TECHNICAL DETAILS

## 5.1 Installation Drawings

| | | |
|---|---|---|
| 5.1.1 | M1019105 | Rear Installation Detail Drawing |
| 5.1.2 | M1019102 | Front Installation Detail Drawing (Ford) |
| 5.1.3 | M1019119 | Front Installation Detail Drawing (Dodge/Sterling) |
| 5.1.4 | M1019103 | Front Installation Detail Drawing (GM/Chevy) |
| 5.1.5 | M1019115 | Alignment Procedure #1 and Traction Adjustment |
| 5.1.6 | M1019128 | Alignment Procedure #2 |
| 5.1.7 | 800312-1/2 | Instruction and Safety Decals (2 Sheets) |
| 5.1.8 | PP006 | Purchased Fastener Torque Specification |
| 5.1.9 | M1019131 | Body Clearance Diagram |

## 5.2 Railgear Options

| | | |
|---|---|---|
| 5.2.1 | Doc | Option Literature |
| 5.2.2 | M1019121 | Rail Sweeps |
| 5.2.3 | M1019123 | Rear Retention Options |
| 5.2.4 | M1019124 | Front Retention Options |
| 5.2.5 | Doc | Steering Wheel Lock |

## 5.3 Hydraulic System

| | | |
|---|---|---|
| 5.3.1 | M1019125 | Valve Assemblies and Parts Diagram |
| 5.3.2 | M1019126 | Hydraulic System W/Locking Valves and Timer |
| 5.3.3 | 10483 | Hydraulic Brake Controller Schematic |
| 5.3.4 | M1019135 | Brake Valve Manifold Assembly (Front and Rear) |
| 5.3.5 | M1019137 | Brake Valve Manifold Assembly (Front Only) |
| 5.3.6 | M1019129 | Cobra Brake Hydraulic Line Installation |
| 5.3.7 | 241504 | RW-1019 Driver Rear Cylinder Assembly w/ Locking Valves |
| 5.3.8 | 241503 | RW-1019 Passenger Rear Cylinder Assembly w/ Locking Valves |
| 5.3.9 | 241404 | RW-1019 Driver Rear Cylinder Assembly w/ Locking Valves – Long Links |
| 5.3.10 | 241403 | RW-1019 Passenger Rear Cylinder Assembly w/ Locking Valves – Long Links |
| 5.3.11 | 241506 | RW-1019 Passenger Rear Cylinder Assembly w/ Locking Valves – X-Short Links |
| 5.3.12 | 241507 | RW-1019 Driver Rear Cylinder Assembly w/ Locking Valves – X-Short Links |

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| | | |
|---|---|---|
| 5.3.13 | 240099/100 (GM/Chevy) | RW-1019 Front Hydraulic Cylinder Assembly |
| 5.3.14 | 240800/801 (Ford/Dodge/Sterling) | RW-1019 Front Hydraulic Cylinder Assembly |
| 5.3.15 | PP008 | Cylinder Assembly Procedures |
| 5.3.16 | PP005 | JIC Fitting Installation |
| 5.3.17 | PP003 | O-Ring Fitting Installation |
| 5.3.18 | PP004 | Pipe Fitting Installation |

## 5.4 Rear Railgear Parts

| | | |
|---|---|---|
| 5.4.1 | Doc | Before Ordering Parts – Rear Railgear |
| 5.4.2 | M1019104 | Rear Assembly Parts Diagram |
| 5.4.3 | 241504 | RW-1019 Driver Rear Cylinder Assembly w/ Locking Valves |
| 5.4.4 | 241503 | RW-1019 Passenger Rear Cylinder Assembly w/ Locking Valves |
| 5.4.5 | 241404 | RW-1019 Driver Rear Cylinder Assembly w/ Locking Valves – Long Links |
| 5.4.6 | 241403 | RW-1019 Passenger Rear Cylinder Assembly w/ Locking Valves – Long Links |
| 5.4.7 | 241506 | RW-1019 Passenger Rear Cylinder Assembly w/ Locking Valves – X-Short Links |
| 5.4.8 | 241507 | RW-1019 Driver Rear Cylinder Assembly w/ Locking Valves – X-Short Links |
| 5.4.9 | M1019111 | Link Dimensions |
| 5.4.10 | M1019107 | Extra-Short Links |
| 5.4.11 | M1019108 | Short Links |
| 5.4.12 | M1019109 | Long Links |
| 5.4.13 | M1019113 | RW-1019 Wheel & Rear Axle Assembly. (Detail) |
| 5.4.14 | M1019123 | Retention Options |
| 5.4.15 | M1019130 | Rear Bracket Options and Dimensions |
| 5.4.16 | 12700 | Brake Assembly |
| 5.4.17 | M1019118 | Rear Grease Point Locations |

## 5.5 Front Railgear Parts

| | | |
|---|---|---|
| 5.5.1 | Doc | Before Ordering Parts – Front Railgear |
| 5.5.2 | M1019101 | Front Assembly Parts Diagram (Ford) |
| 5.5.3 | M1019120 | Front Assembly Parts Diagram (Dodge/Sterling) |
| 5.5.4 | M1019110 | Front Assembly Parts Diagram (GM/Chevy) |
| 5.5.5 | 240800/801 (Ford/Dodge/Sterling) | RW-1019 Front Hydraulic Cylinder Assembly |

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| | | |
|---|---|---|
| 5.5.6 | 240099/100 (GM/Chevy) | RW-1019 Front Hydraulic Cylinder Assembly |
| 5.5.7 | M1019116 | Long Arm Variations |
| 5.5.8 | M1019112 | RW-1019 Wheel & Front Axle Assembly. (Detail – Ford/Dodge/Sterling) |
| 5.5.9 | M1019114 | RW-1019 Wheel & Front Axle Assembly. (Detail – GM/Chevy) |
| 5.5.10 | M1019124 | Retention Options |
| 5.5.11 | MGENN101 | RW-1019 Mounting Tube Variations |
| 5.5.12 | MGENN100 | RW-1019 Spring Hanger Variations |
| 5.5.13 | 12700 | Brake Assembly |
| 5.5.14 | M1019117 | Front Grease Point Locations |

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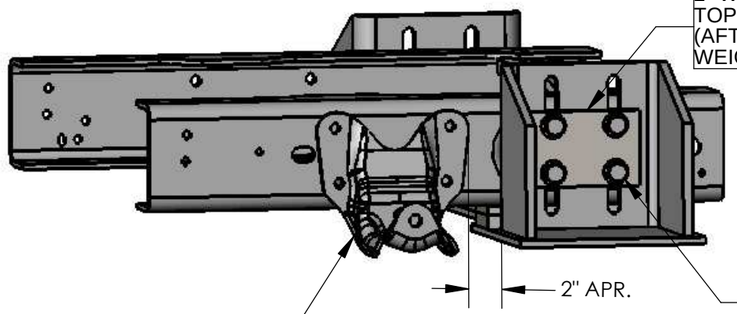
FOR SPECIFIC PART NUMBERS REFERENCE DRAWING #M1019104

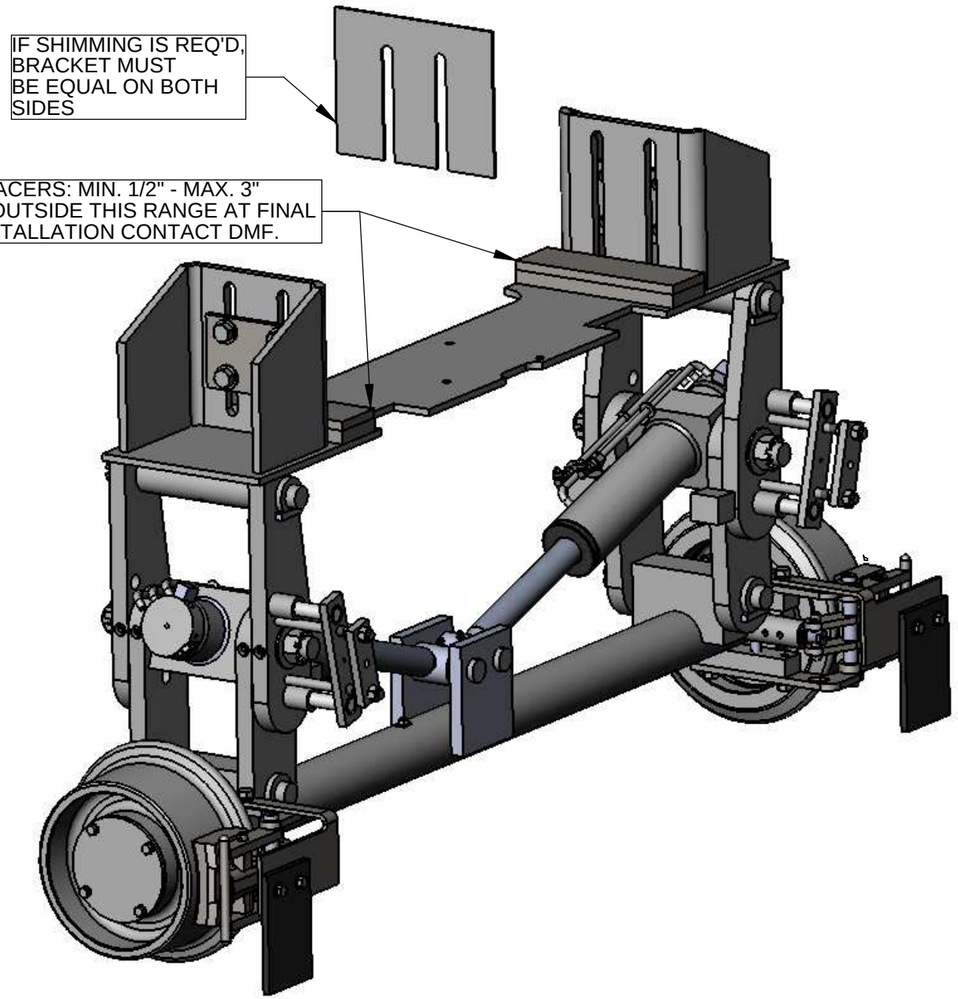


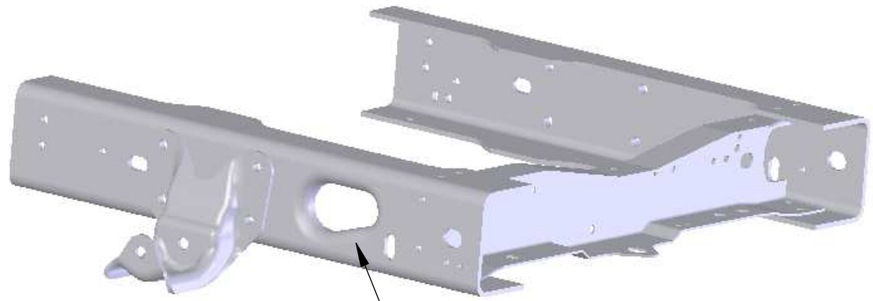

NOTE #1: GRADE 5 BOLTS MUST BE USED WHEN MOUNTING GEAR TO TRUCK FRAME

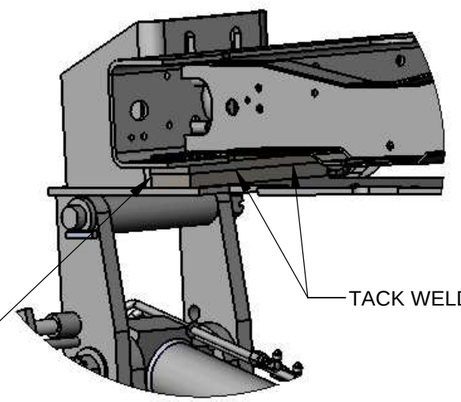
NOTE #2: AT FINAL INSTALLATION:
(AFTER OVERALL FRONT TO BACK RAILGEAR ALIGNMENT & WEIGHT SETTING HAVE BEEN COMPLETED)
FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.

WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS & LEAD TO PREMATURE BEARING FAILURE.

- ENSURE SPACERS ARE PRESSED FULLY AGAINST SIDE BRACKET (OR SHIMS) & ALIGNED WITH THE REAR BRACKET (WELD AS INDICATED IN THE DETAIL ABOVE)
- IF MULTIPLE SPACERS ARE USED, ENSURE THAT THEY ARE WELDED TO ONE ANOTHER (WELD AS INDICATED IN DETAIL ABOVE)
- ENSURE BOLTS ARE TIGHTENED TO TORGUE SPECS: 154 LB-FT
- WELD 4-HOLE MOUNTING PLATE TO REAR BRACKET SIDE PLATE AS SHOWN IN THE DETAIL ABOVE





FORD/DODGE ONLY
PRIOR TO ATTACHING REAR FRAME BRACKET:
TRIM INTERIOR PROTRUSION AT FUEL PASSTHROUGH
AND PATCH HOLE WITH COMPARABLE THICKNESS
MATERIAL.




ENSURE ALL SPACERS ARE FIRMLY AGAINST SIDE BRACKET & ALIGNED WITH THE REAR MOUNTING BRACKET. FULLY WELD SPACER TO MOUNTING BRACKET AS SHOWN (IF MULTIPLE SPACERS ARE USED, SPACERS NEED TO BE WELDED TO ONE ANOTHER AT THE REAR AND TACK WELDED ON THE SIDES)

## APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.030 X 45° MAX.)

-

TITLE: MANUAL, REAR ASSY INSTALL, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

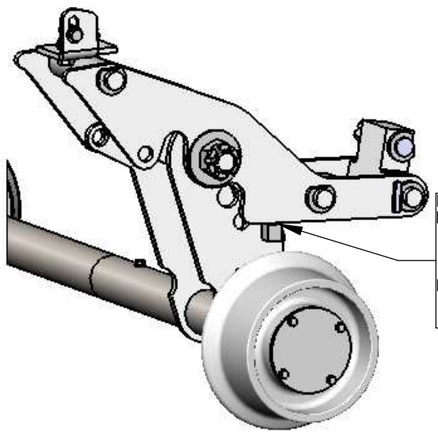
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/7/11 | M1019105 | # |

**FOR INDIVIDUAL PARTS LIST OR PARTS ORDERING, REFER TO DRAWING #M1019101**

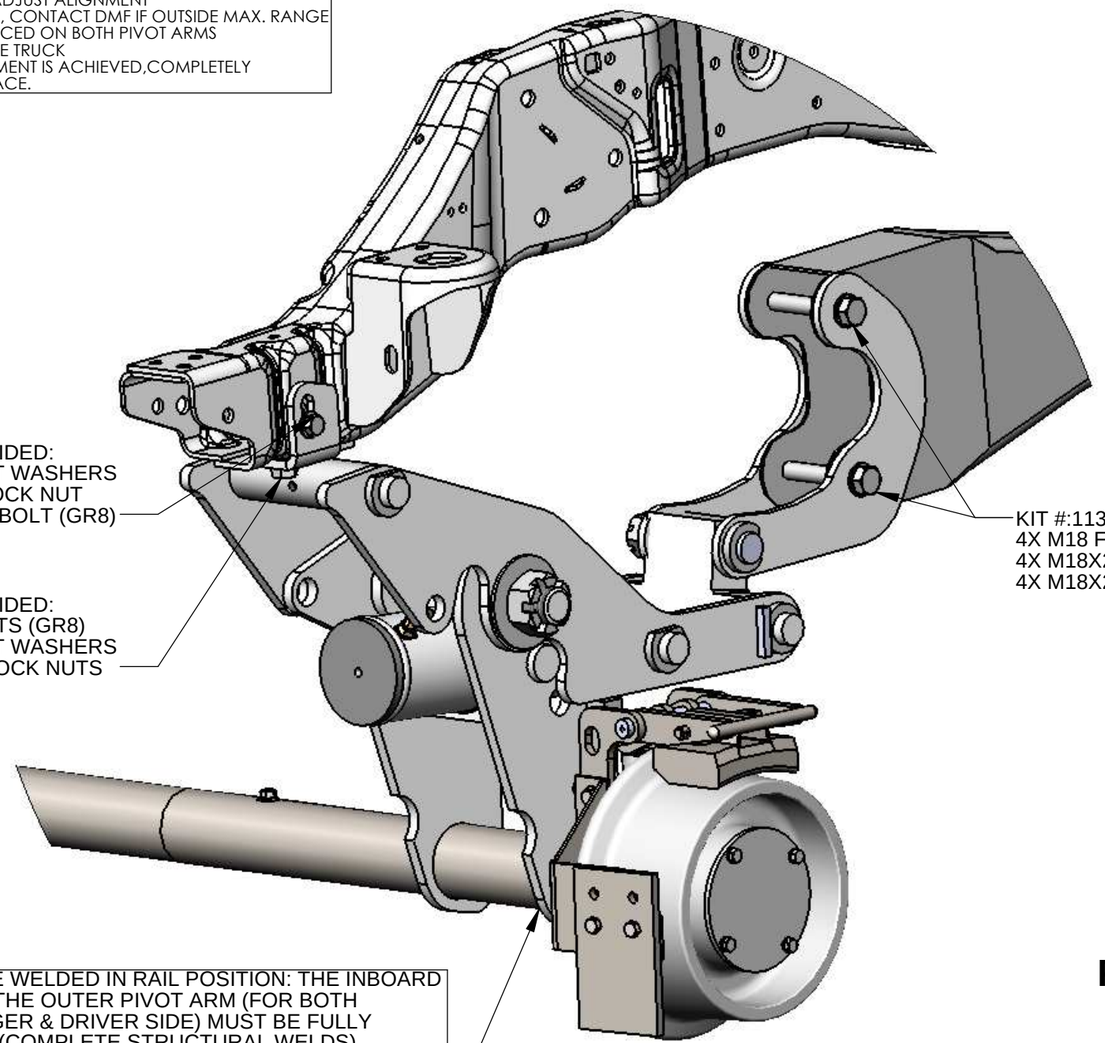
NOTE #1: GRADE 8 BOLTS MUST BE USED WHEN MOUNTING GEAR TO TRUCK FRAME.

NOTE #2: AT FINAL INSTALLATION: (AFTER OVERALL FRONT TO BACK RAILGEAR ALIGNMENT & WEIGHT SETTING HAVE BEEN COMPLETED) FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.

WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS LEAD TO PRE-MATURE BEARING FAILURE



**RAILGEAR ALIGNMENT ADJUSTMENT:**
IF SLIGHT ADJUSTMENTS NEEDED:
- ADD SHIM STOCK TO ADJUST ALIGNMENT
- 1/4" MAX. ALLOWABLE, CONTACT DMF IF OUTSIDE MAX. RANGE
- SHIMS SHOULD BE PLACED ON BOTH PIVOT ARMS FOR A GIVEN SIDE OF THE TRUCK
- ONCE PROPER ALIGNMENT IS ACHIEVED,COMPLETELY WELD ALL SHIMS IN PLACE.



NOT PROVIDED:
1/2-13 FLAT WASHERS
12-13 NYLOCK NUT
1/2-13 X 2" BOLT (GR8)

NOT PROVIDED:
5/8-11 BOLTS (GR8)
5/8-11 FLAT WASHERS
5/8-11 NYLOCK NUTS

KIT #:11342
4X M18 FLAT WASHERS,
4X M18X2.5X140mm LONG
4X M18X2.5 LOCK NUT

NOTE: BEFORE INSTALLING AXLE BRACKETS:
RAISE VEHICLE AND SUPPORT WITH JACKSTANDS, REMOVE FRONT WHEELS AND TIRES

NOTE: WHEN INSTALLING AXLE BRACKETS:
DISCONNECT LOWER SHOCK MOUNT AND SUPPORT RADIUS ARM WITH A JACKSTAND OR OTHER MEANS, REMOVE FACTORY HARDWARE AND ATTACH AXLE BRACKETS USING PROVIDED HARDWARE (KIT#11342)

*MUST BE WELDED IN RAIL POSITION: THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVER SIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

DRIVER'S SIDE VIEW OF DRIVER'S SIDE ASSEMBLY

# FORD F-4/550 FRONT INSTALLATION

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.010 R MAX)

-

TITLE: MANUAL, '08 F-550 FRONT ASSY INSTALL, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

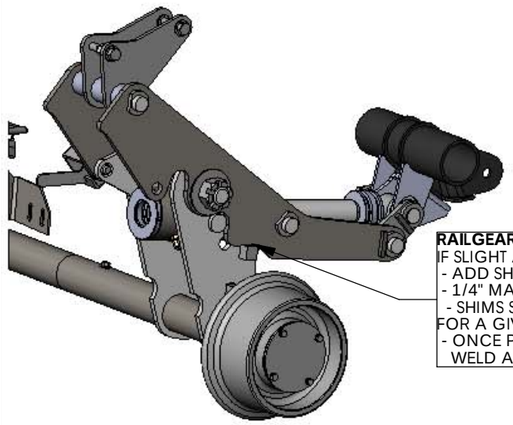
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/6/11 | M1019102 | # |

FOR SPECIFIC PART NUMBERS REFER TO DRAWING: M1019120

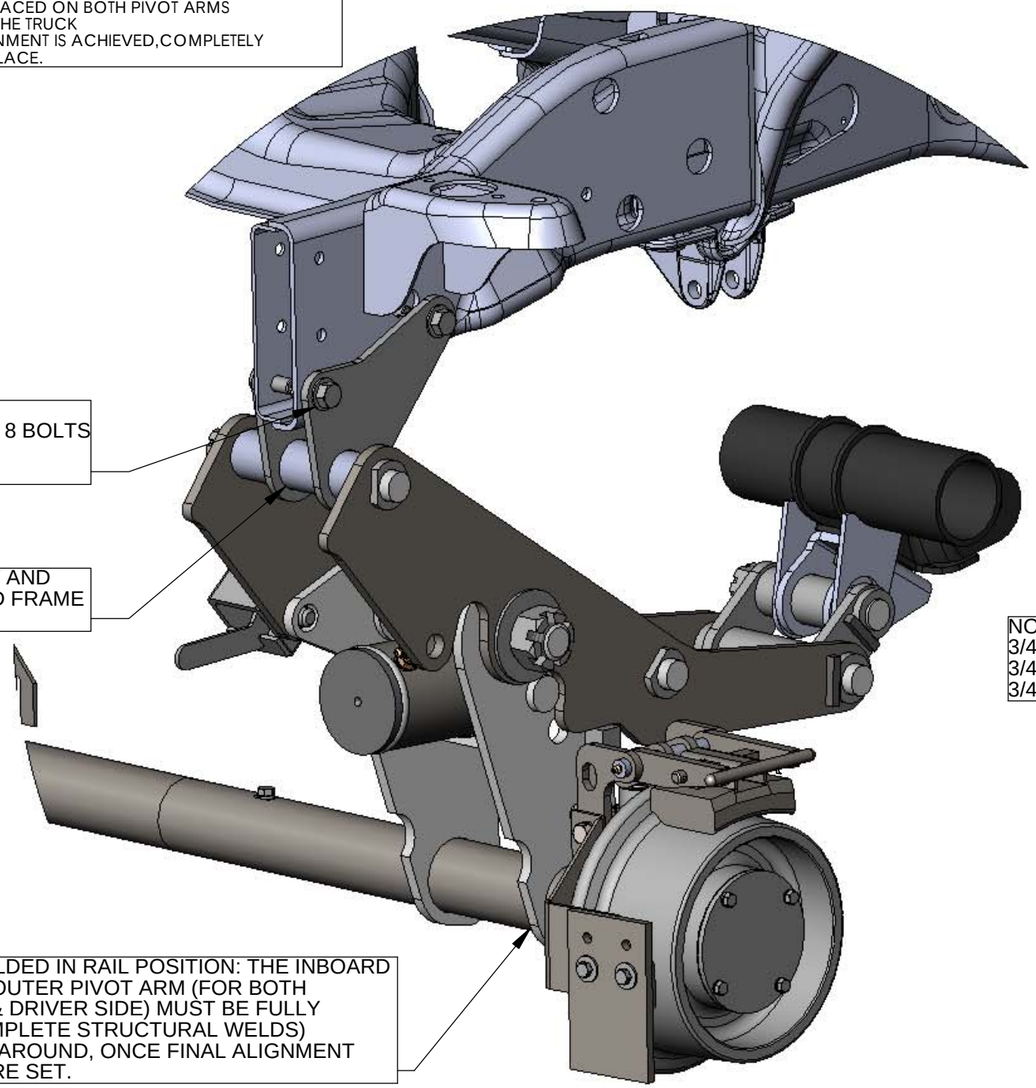
NOTE #1: GRADE 8 BOLTS MUST BE USED WHEN MOUNTING GEAR TO TRUCK FRAME.

NOTE #2: AT FINAL INSTALLATION: (AFTER OVERALL FRONT TO BACK RAILGEAR ALIGNMENT & WEIGHT SETTING HAVE BEEN COMPLETED) FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.

WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS LEAD TO PRE-MATURE BEARING FAILURE



**RAILGEAR ALIGNMENT ADJUSTMENT:**
IF SLIGHT ADJUSTMENTS NEEDED:
- ADD SHIM STOCK TO ADJUST ALIGNMENT
- 1/4" MAX. ALLOWABLE, CONTACT DMF IF OUTSIDE MAX. RANGE
- SHIMS SHOULD BE PLACED ON BOTH PIVOT ARMS FOR A GIVEN SIDE OF THE TRUCK
- ONCE PROPER ALIGNMENT IS ACHIEVED,COMPLETELY WELD ALL SHIMS IN PLACE.



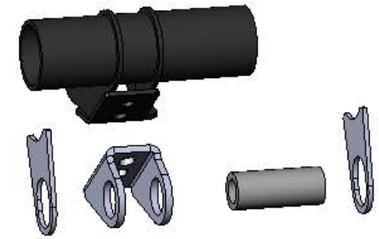
NOT SUPPLIED:
5/8-11 X 1-1/2 GRADE 8 BOLTS
5/8 FLAT WASHERS
5/8-11 NYLOCK NUTS

NOTE: AFTER FINAL ALIGNMENT AND WEIGHTS ARE SET, FULLY WELD FRAME BRACKETS TO CROSSTUBE

*MUST BE WELDED IN RAIL POSITION: THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVER SIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

DRIVER'S SIDE VIEW OF DRIVER'S SIDE ASSEMBLY

NOTE:
- ALIGN FORMED BRACKET WITH WELDMENT ON AXLE
- MATCH DRILL HOLES FOR MOUNTING
- BOLT BRACKET IN PLACE AND POSITION CROSSTUBE AND BRACKET SIDE PLATES
- AFTER FINAL ALIGNMENT, FULLY WELD BRACKET SIDE PLATES AND CROSSTUBE TO AXLE BRACKET



NOT PROVIDED:
3/4-10 GRADE 8 BOLTS
3/4 FLAT WASHERS
3/4-10 NYLOCK NUTS

NOTE: BEFORE INSTALLING AXLE BRACKETS:
RAISE VEHICLE AND SUPPORT WITH JACKSTANDS,
REMOVE FRONT WHEELS AND TIRES

# DODGE/STERLING 45/5500 FRONT INSTALLATION

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.020") 45° MAX.

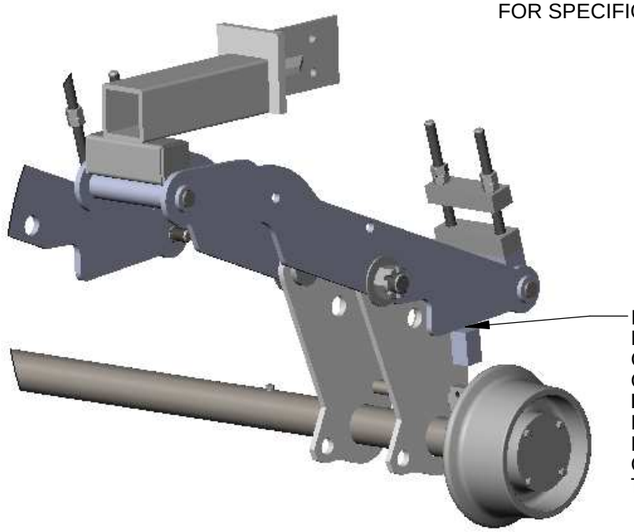
-

TITLE: MANUAL, '08 DODGE/STER 4/5500, FRONT ASSY INSTALL, RW-1019

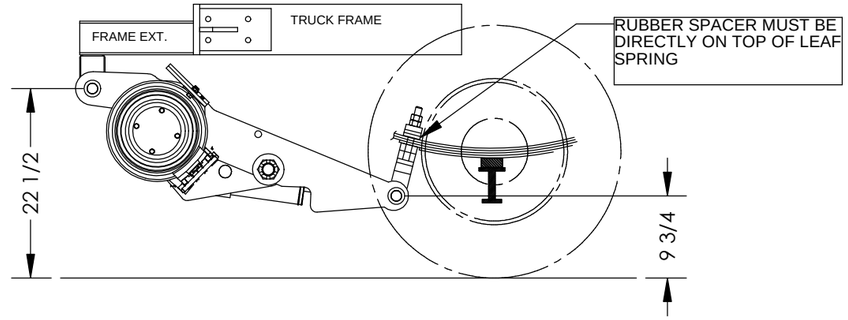
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/27/11 | M1019119 | # |

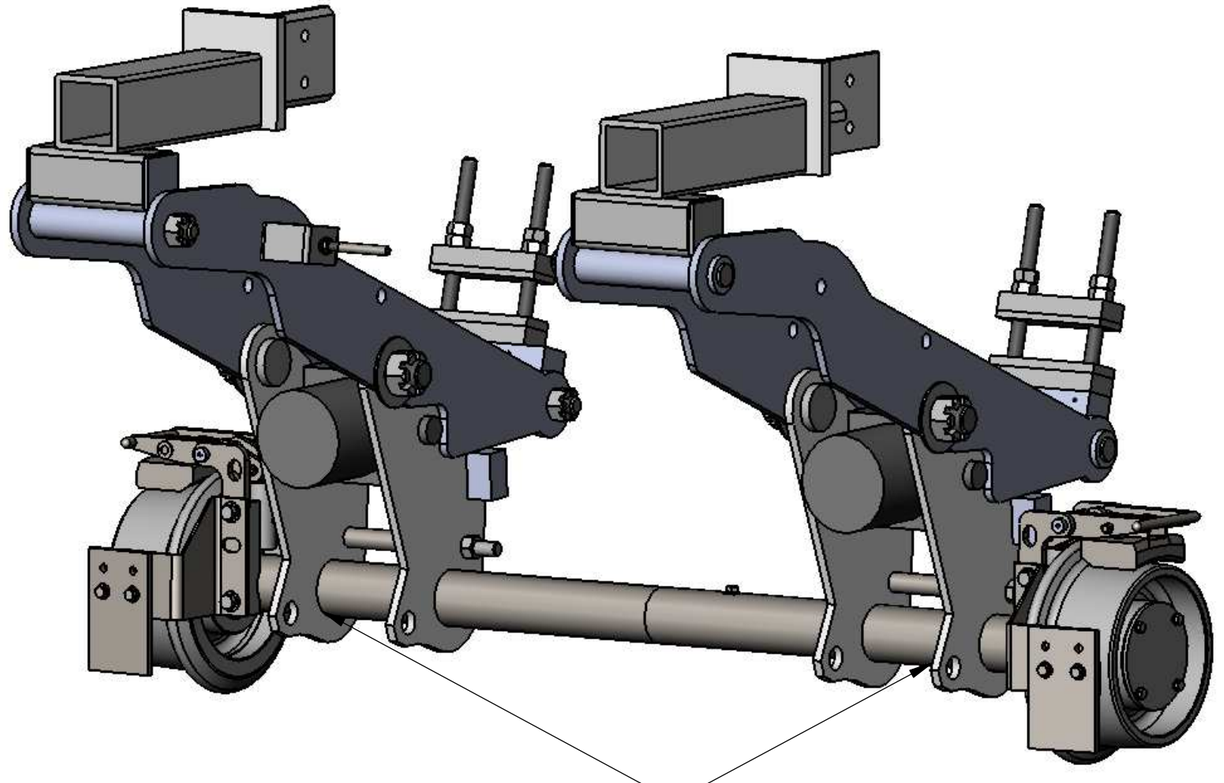
FOR SPECIFIC PART NUMBERS REFER TO DRAWING: M1019110



INSTALL SHIMS HERE
MAX. ALLOWABLE 1/4"
CONTACT DMF IF
OUTSIDE MAX. RANGE
**NOTE:**SHIMS SHOULD
BE PLACED ON BOTH
PIVOT ARMS FOR A
GIVEN SIDE OF THE
TRUCK.




**NOTE: DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY DEPENDING ON OPTIONS YOUR PART MAY NOT BE EXACTLY AS PICTURED**



**MUST BE WELDED IN RAIL POSITION:** THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVERSIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

# GM/CHEVY 45/5500 FRONT INSTALLATION

NOTE #1: GRADE 8 BOLTS MUST BE USED WHEN MOUNTING FRAME EXTENSIONS TO TRUCK FRAME

NOTE #2: AT FINAL INSTALLATION

- FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.
- WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS & LEAD TO PREMATURE BEARING FAILURE.
- MUST BE WELDED IN RAIL POSITION: THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVER SIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET)
- FRONT CROSS TUBES MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) TO TRUCK FRAME OR FRAME EXTENSIONS ALL THE WAY AROUND.
- IF SHIMS REQUIRED, RULLY WELD ALL SHIMS IN ALL LOCATIONS, IN PLACE, ONCE ALIGNMENT IS ACHIEVED (IF MORE THAN ONE SHIM PER LOCATION, THEN ALL SHIMS USED AT LOCATION SHOULD BE WELDED TO ONE ANOTHER.)

NOTE #3:

- ONCE SPRING BRACKET IS FINALLY SET, WHERE CLEARANCE ALLOWS, LEAVE 1" THREADED ROD EXPOSED ABOVE NUT (2 THREADS MIN.) - SEE ABOVE ILLUSTRATION

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| 2 | | | | |
| 1 | - | - | - | |

| TOLERANCES: (UNLESS SPECIFIED) | | | | |
|---|---|---|---|---|
| FRAC., MACH: | ± 1/32" | - | TITLE: MANUAL, '08 C4/5500 FRONT ASSY INSTALL, RW-1019 | |
| FRAC., OTHER: | ± 1/16" | | | |
| .X | ± .063 | | | |
| .XX | ± .030 | | DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512 | |
| .XXX | ± .005 | | | |
| DRILL SIZES: | ± .015 | DRAWN BY: NEH / APPD BY: | DATE: 4/7/11 | DRAWING NUMBER: M1019103 / REV: # |
| ANGULAR: | ± 1° | | | |
| SURF FINISH: | 125 MICRO | | | |
| THREADS: | 2A AND 2B | | | |

BREAK SHARP EDGES (.015 R X 45° MAX.)

## ALIGNMENT PROCEDURE

A) STEPS 1) and 2) must be completed in listed order and are assumed to be within specifications and should only be addressed, if after alignment of the railgear, excessive flanging occurs.

1) Frame should be square, to within 1/8" maximum, on the diagonal.

2) Rear drive axle should be square to frame within 1-1/6" maximum on the diagonal to achieve 0° thrust angle. this should be checked by a qualified alignment shop.

B) The following procedure applies to shop or field inspection.

1) Check air pressure in all tires. tires should be inflated to the minimum rating of the wheel or tire.

2) Place vehicle on straight and level track, or 3" channel to simulate rail. Lower the railgear to the rail so that front to rear and diagonal measurements can be made. (Note: these measurements can be made from any convenient locations, as long as it stays consistent from side to side.

3) If diagonal measurement is out of tolerance, adjustment of the front railgear must be made. The procedure for this is as follows (for D-1 & D-2 only): Place shim material between the stop block on the pivot arm (see dwg below) & where it comes into contact with the long arm. The location for the shim is most accessible from behind the front Railgear axle (example: shim on left side, it will push left axle forward). Once proper shimming has been obtained, weld the shim into place on the pivot arm. Max. allowable 1/4" - Contact DMF if outside the maximum range.

## TRACTION ADJUSTMENT PROCEDURE

Tire traction varies w/ every truck based on several factors such as weight & tire design. It can also vary on the same truck as equipment is added or deleted. Thus, we recommend performing the traction adjustments after all equipment is installed or removed. Since every truck differs, there is no exact procedure. However, we have found the following two methods to be a good guide. The true test is how the vehicle performs on rail.

### METHOD #1

Note: Method #1 is a visual procedure of the tire capping on rail.

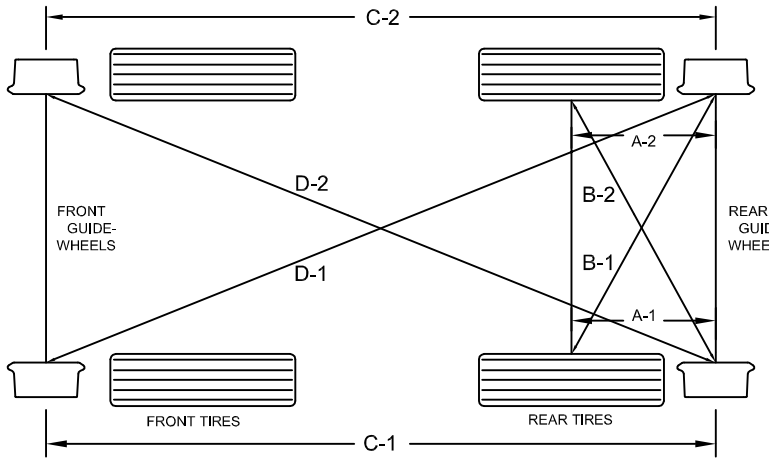
1) Grind off the welds on the (2) four hole mounting plates at the rear mounting bracket.
2) Loosen the (8) rear bracket mounting bolts.
3) Lower the railgear supporting the railgear with a floor jack or with the unit itself.
4) Remove or add spacer shim material located between the bottom of the truck frame and the shelf on the rear mounting bracket. Add shim to decrease traction and remove shim to increase traction (ref. side dwg. for illustration of proper tire capping).
5) Raise Railgear once again to contact the bottom of the truck frame.
6) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If multiple spacers are used, remember to weld spacers to one another.

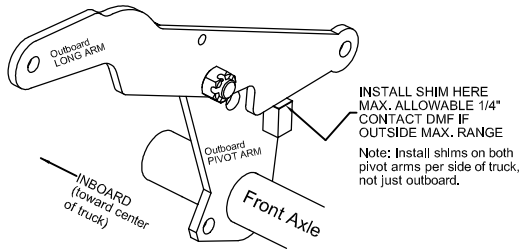
### METHOD #2

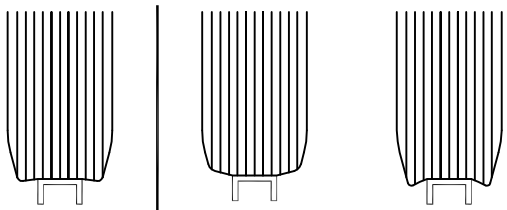
Note: Method #2 distributes the vehicles rear axle(s) weight(s) equally over all rear axles, including the Railgear.

1) If truck scales are available, weigh the vehicle's rear axle (if tandem, weigh both)
2) With front and rear Railgear lowered, add or remove shims until rear Railgear axle weight is distributed equally between rear truck axle & Railgear.
3) Once weight is equally distributed, then stow Railgear.
4) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If have multiple spacers, remember to weld spacers to one another.

| INSPECTOR: | | DATE: | |
|---|---|---|---|
| SPECIFICATION | S/B = to | SPECIFICATION | TOLERANCES |
| A–1 | = | A–2 | ± 1/16" |
| B–1 | = | B–2 | ± 1/8" |
| C–1 | = | C–2 | ± 1/8" |
| D–1 | = | D–2 | ± 1/4" |





Outboard LONG ARM
INSTALL SHIM HERE MAX. ALLOWABLE 1/4" CONTACT DMF IF OUTSIDE MAX. RANGE
Note: Install shims on both pivot arms per side of truck, not just outboard.
Outboard PIVOT ARM
INBOARD (toward center of truck)
Front Axle



**Frame Set OK** | **Frame Too High** | **Frame Too Low**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS

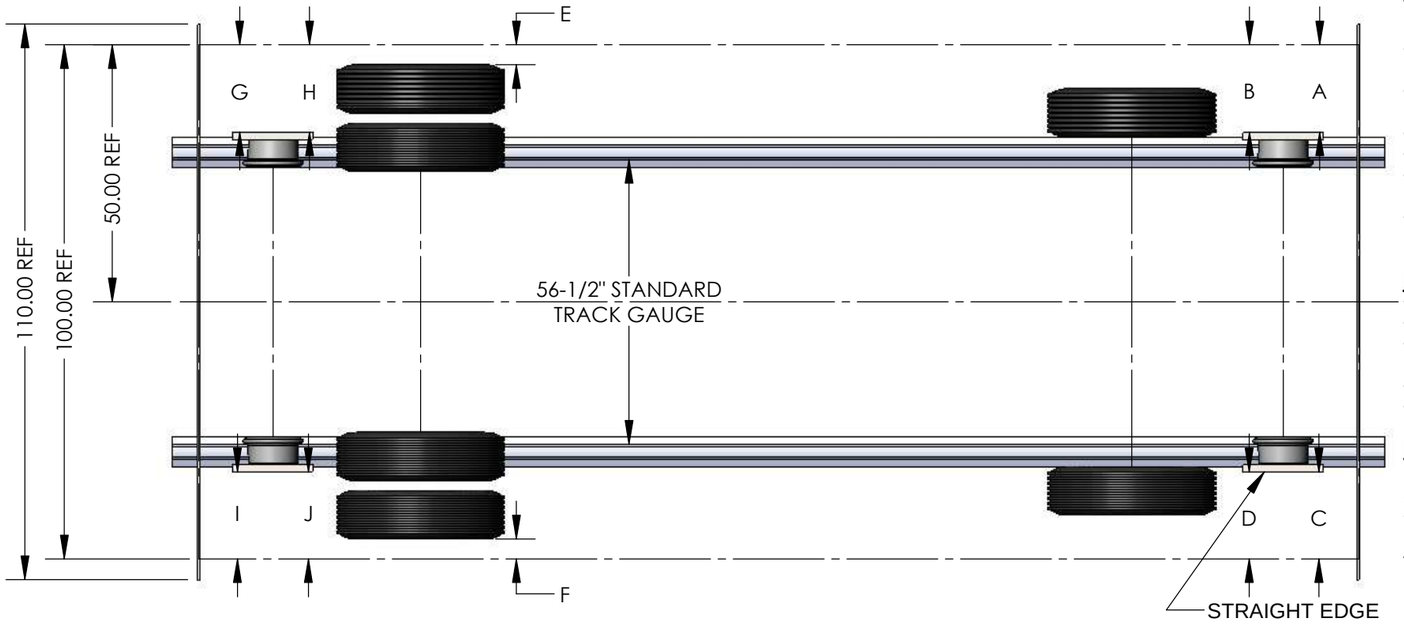
| | |
|---|---|
| FRAC. MACH: | ± 1/32" |
| FRAC. OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX OR .XXXX | ± .005 |
| DRILL SIZES: | ± .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

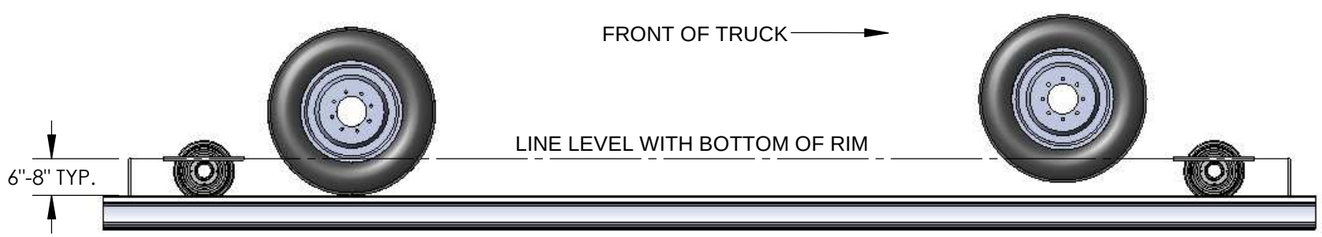
BREAK SHARP EDGES ( 0.000 X 45° MAX )

TITLE: ALIGNMENT PROCEDURE & TEAR SHEET & TRACTION ADJUSTMENT PROCEDURES

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| JBG | | 11/03/10 | M1019115 | # |




## STRINGLINE ALIGNMENT:

THE OBJECTIVE OF THIS STYLE OF ALIGNMENT IS TO CREATE TWO LINES (ONE ON EITHER SIDE OF THE VEHICLE) THAT ARE PARALLEL TO AND THE SAME DISTANCE FROM THE TRUCK CENTERLINE. THESE LINES WILL BE USED AS STRAIGHT EDGES FROM WHICH MEASUREMENTS WILL BE TAKEN TO ALIGN THE RAILGEAR TO THE TRUCK CHASSIS. WHEN USING THIS METHOD, THERE ARE SEVERAL KEY FACTORS THAT MUST BE TAKEN INTO CONSIDERATION.

- THIS TYPE OF ALIGNMENT SHOULD BE PERFORMED ON RAIL (OR SIMULATED RAILS), IN THE CASE OF AN EMERGENCY, IT MAY BE PERFORMED ON AN OPEN LEVEL SURFACE
- RAILS (OR SIMULATED RAILS) SHOULD BE SET AT THE PROPER GAGE AND THE CHASSIS SHOULD BE CENTERED ON RAIL
- STEERING WHEELS SHOULD BE STRAIGHT AHEAD
- STRINGLINES MUST BE TAUT ENOUGH TO ENSURE ACCURATE MEASUREMENTS
- WHEN MEASURING TO THE RAILWHEELS, USE A STRAIGHT EDGE ACROSS THE OUTSIDE FACE OF THE WHEEL TO ENSURE ACCURATE MEASUREMENT
- WHEN MEASURING TO THE TRUCK TIRES, MEASUREMENT SHOULD BE TAKEN AT THE LOWER BEAD OF THE RIM

**ITEMS YOU WILL NEED**

- STRINGLINE - MAY BE LIGHT CABLE, TWINE, OR SIMILAR
- ALIGNMENT BARS - MAY BE ANY STURDY STRAIGHT EDGE (I.E. STEEL BAR, 2X4, ETC.)
- LINE STANCHIONS - ATTACHMENT POINTS FOR THE STRINGLINES - MUST BE STURDY ENOUGH TO WITHSTAND A TAUT LINE
- STRAIGHT EDGE - MAY BE RULER, STEEL STOCK, ETC.
- TAPE MEASURE

**PROCEDURE**

1. PULL VEHICLE ON RAIL ENSURING THAT THE CHASSIS IS CENTERED
2. DEPLOY RAILGEAR
3. SET ALIGNMENT BARS FORWARD AND BEHIND THE VEHICLE AND CLAMP TO RAIL (BE SURE THAT THE BARS ARE SQUARE TO RAIL AND CHASSIS)
4. FASTEN LINE STANCHIONS TO ALIGNMENT BARS AT A HEIGHT EVEN WITH THE LOWER BEAD OF TIRE RIM (TYPICALLY 6-8") AND EQUIDISTANT FROM THE CENTERLINE (DIMENSIONS GIVEN ARE FOR REFERENCE ONLY, YOUR APPLICATION MAY REQUIRE A WIDER OR NARROWER STRING SET)
5. PULL STRINGLINES TAUT AND SECURE AT LINE STANCHIONS
6. PULL DIMENSIONS E & F; IF OUTSIDE TOLERANCE RANGE, REPOSITION STRINGLINES AS NEEDED
7. PULL REMAINING LABELED DIMENSIONS, IF OUTSIDE TOLERANCE RANGE, ADJUST AS NECESSARRY (REFER TO SECTION 4.0 RAILGEAR INSTALLATION)
8. ONCE PROPER ALIGNMENT IS ACHIEVED, REMOVE TRUCK FROM RAIL AND PERFORM RAIL TEST
9. IF RAIL TEST IS SUCCESFUL, PERFORM FINAL WELD-OUT PROCEDURES AND REFER TO SECTION 4.10 INSTALLATION REVIEW CHECKLIST

| MEASUREMENT | SPEC | MEASURED |
|---|---|---|
| CENTER REAR AXLE TO RAIL | | |
| E=F | ±1/32 | / |
| ALIGN FRONT RAILWHEELS | | |
| A=B | ±1/16 | / |
| C=D | ±1/16 | / |
| A=C | ±1/16 | / |
| ALIGN REAR RAILWHEELS | | |
| G=H | ±1/16 | / |
| I=J | ±1/16 | / |
| G=I | ±1/16 | / |

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| 2 | | | | |
| 1 | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC., MACH: ± 1/32"
FRAC., OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.015 R AT MAX.)

-

TITLE: MANUAL, STRINGLINE ALIGNMENT METHOD, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 5/17/11 | M1019128 | # |

INSTRUCTIONS-

1. REMOVE SAFETY PINS
2. ACTIVATE VALVE
   A. PUSH- RAIL POSITION
   B. PULL- HIGHWAY POSITION
3. REPLACE SAFETY PINS
   IN PROPER LOCATION.

800117

INSTRUCTIONS-

1. REMOVE SAFETY PINS
2. ACTIVATE VALVE
   A. PUSH- RAIL POSITION
   B. PULL- HIGHWAY POSITION
3. REPLACE SAFETY PINS
   IN PROPER LOCATION.

800117

While In Rail Position, Weld
Inboard Side Of Outer Pivot Arm To
Axle Tube, All The Way Around.
Questions, Call DMF (404) 875-1512

800299

# OPERATION OF D.M.F. GUIDE WHEEL SYSTEM

## TO PLACE VEHICLE ON RAIL

1. Drive vehicle on crossing, centering it over tracks.

2. Once centered over tracks, remove front and rear safety pins.

3. Lower rear wheels first.
   A. If rear is not completely centered (within 4"), rear rail wheels will center truck on rail.

   B. With rear wheels fully extended and properly seated on rail, install safety pin into lower hole on both sides.

4. Center front rail wheels over rail.
   A. If front is not completely centered over rail, maneuver truck so that it is.

   B. Front vehicle wheels must be straight ahead.

   C. Lower front rail wheels until cylinders are fully retracted. Front rail wheels incorporate over center design and do not require safety pins in rail position.

5. Double check all flanges to assure they are seated properly on rail and safety pins are installed.

6. Engage steering wheel lock if equipped.

Safe operating speeds on rail will be governed by track conditions and existing railroad rules and regulations. Under no conditions should vehicle be operated over 30 MPH on track.

## TO REMOVE VEHICLE FROM RAIL

1. Drive vehicle over road crossing.

2. Either front or rear wheels may be activated first.

3. Front rail wheels
   A. Retract front rail wheels completely.
   B. Once retracted, install safety pins.

4. Rear rail wheels
   A. Remove safety pins.
   B. Fully retract rear rail wheels.
   C. Re-Install rear safety pins.

5. Double check all safety pins are in proper location.

6. Disengage steering wheel lock if equipped.

DIVERSIFIED METAL FABRICATORS (404) 875-1512 ATLANTA, GA

800116

DMF
ON
HI-RAIL
BRAKE
OFF

10484

800312-1

## SAFETY INSTRUCTIONS

Lock front wheels straight ahead for on-rail travel. 800119

## ⚠ CAUTION ⚠

RELIEF VALVE SETTINGS: 2000 PSI, FRONT
1500 PSI, REAR
DO NOT EXCEED: 2500 PSI, FRONT VALVE
DO NOT EXCEED: 2000 PSI, REAR VALVE
DO NOT BOTTOM-OUT RELIEFS, IF ADJUSTED

800135


## ⚠ CAUTION ⚠

RELIEF VALVE SETTINGS: 2000 PSI, FRONT
1500 PSI, REAR
DO NOT EXCEED: 2500 PSI, FRONT VALVE
DO NOT EXCEED: 2000 PSI, REAR VALVE
DO NOT BOTTOM-OUT RELIEFS, IF ADJUSTED

800135


HI-RAIL VEHICLE COMPLETED BY: _____

WITH APPLICATION OF HI-RAIL AND FINISHED BODY, THIS VEHICLE HAS _____ POUNDS OF AVAILABLE PAYLOAD.

DATE OF COMPLETION OF HI-RAIL EQUIPPED VEHICLE: mo _____ yr _____

CAUTION: THIS MUTIPURPOSE VEHICLE HAS SPECIAL DESIGN AND EQUIPMENT FEATURES FOR OFF-ROAD USE. IT HANDLES DIFFERENTLY FROM AN ORDINARY PASSENGER CAR IN DRIVING CONDITIONS WHICH MAY OCCUR ON STREETS, HIGHWAYS, AND OFF-ROAD.

WEIGHT AND LOCATIONS OF AVAILABLE PAYLOAD MAY ALSO AFFECT THE HANDLING OF THIS VEHICLE. DRIVE WITH CARE AND WEAR SAFTETY BELTS AT ALL TIMES.

FOR PRECAUTIONS, READ THE VEHICLE OWNER'S GUIDE AND HI-RAIL OPERATORS SERVICE AND PARTS MANUAL.

800118

## INSPECTION AND MAINTENANCE OF D.M.F. GUIDE WHEEL SYSTEM

DAILY:
Visually inspect rail gear for hydraulic leaks, loose fasteners, and excessive wear.
Spin all four wheels noting any bearing noise or resistance.
Check level of hydraulic oil.
Compare left and right wheels for wear (particularly diagonal flanges).

WEEKLY:
Grease all fittings on rail.
Six (6) on front assembly.
Fourteen (14) on rear assembly.
Inspect the bearing grease every 2,000 miles or 6 months (whichever comes first).
Inspect bearings and grease cavity by removing hubcaps. Unless bearing problem is suspected, the bearings do not need to be removed or repacked. If repacking is required, the grease cavity should be only 80% filled with suitable grease. Replace hubcaps using a bead of Form-A-Gasket (or equal).

ANNUALLY:
Change hydraulic oil filter element.

**DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512 ATLANTA, GA**

800114

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

TITLE: Purchased Fastener Torque Specification

PURPOSE: To Establish Production Methods For The Installation Of Commonly Purchased Threaded Fasteners.

COMMON USAGE: Most Areas Of Multiple Part Assembly And Retention.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Most Common Sizes Of SAE J429 Grade 5 And 8 And Of ASTM A574 "Alloy" Bolts.

PROCEDURE: A) Identify The Fastener As Either Fine Or Coarse Thread, Select The Appropriate Chart Below.

B) Identify The Fastener Size (Diameter And Threads Per Inch), Select The Appropriate Row In The Chart Selected.

C) Identify Grade Of The Bolt.

D) Identify Whether The Bolt Is Plated Or Plain.

E) Read Across The Size Row And Down The Grade And Plain Or Plated Column. The Intersection Of Row And Column Gives Torque.

FINE THREAD BOLTS

| SIZE (DIA-TPI) | SAE J429 GRADE 5 (3 MARKS) PLAIN (FTLB) | SAE J429 GRADE 5 (3 MARKS) PLATED (FTLB) | SAE J429 GRADE 8 (6 MARKS) PLAIN (FTLB) | SAE J429 GRADE 8 (6 MARKS) PLATED (FTLB) | ASTM A574 ALLOY (KNURLED OD) PLAIN (FTLB) | ASTM A574 ALLOY (KNURLED OD) PLATED (FTLB) |
|---|---|---|---|---|---|---|
| 5/16-24 | 19 | 14 | 27 | 20 | 27 | 20 |
| 3/8-24 | 35 | 26 | 49 | 35 | 47 | 55 |
| 7/16-20 | 55 | 41 | 78 | 58 | 75 | 56 |
| 1/2-20 | 90 | 64 | 120 | 90 | 115 | 86 |
| 9/16-18 | 120 | 90 | 170 | 130 | 165 | 125 |
| 5/8-18 | 170 | 130 | 240 | 180 | 220 | 165 |
| 3/4-16 | 300 | 225 | 420 | 315 | 400 | 300 |
| 7/8-11 | 445 | 325 | 670 | 500 | 635 | 475 |
| 1-12 | 645 | 485 | 995 | 745 | 915 | 685 |
| 1 1/8-12 | 890 | 670 | 1445 | 1085 | 1385 | 1040 |
| 1 1/4-12 | 1240 | 930 | 2010 | 1510 | 1885 | 1415 |
| 1 3/8-12 | 1675 | 1255 | 2710 | 2035 | 2440 | 1830 |
| 1 1/2-12 | 2195 | 1645 | 3560 | 2670 | 3275 | 2455 |

RECOMMENDED TORQUE FOR GR 8 W/ PREVAILING TORQUE NUT

| SIZE | FT-LB |
|---|---|
| 1/2-13 | 55 |
| 1/2-20 | 60 |
| 5/8-11 | 120 |
| 5/8-18 | 125 |
| 3/4-10 | 180 |
| 3/4-16 | 180 |
| 1-8 | 400 |
| 1-14 | 425 |

COARSE THREAD BOLTS (MATCHING HEX NUTS)

| SIZE (DIA-TPI) | SAE J429 GRADE 5 (3 MARKS) PLAIN (FTLB) | SAE J429 GRADE 5 (3 MARKS) PLATED (FTLB) | SAE J429 GRADE 8 (6 MARKS) PLAIN (FTLB) | SAE J429 GRADE 8 (6 MARKS) PLATED (FTLB) | ASTM A574 ALLOY (KNURLED OD) PLAIN (FTLB) | ASTM A574 ALLOY (KNURLED OD) PLATED (FTLB) |
|---|---|---|---|---|---|---|
| 5/16-18 | 17 | 13 | 25 | 18 | 25 | 19 |
| 3/8-16 | 31 | 23 | 44 | 33 | 45 | 34 |
| 7/16-14 | 49 | 37 | 70 | 52 | 70 | 53 |
| 1/2-13 | 75 | 57 | 105 | 80 | 108 | 81 |
| 9/16-12 | 110 | 82 | 155 | 115 | 155 | 115 |
| 5/8-11 | 150 | 115 | 220 | 160 | 210 | 160 |
| 3/4-10 | 265 | 200 | 375 | 280 | 365 | 275 |
| 7/8-9 | 395 | 295 | 605 | 455 | 585 | 440 |
| 1-8 | 590 | 445 | 910 | 680 | 865 | 650 |
| 1 1/8-7 | 795 | 595 | 1290 | 965 | 1240 | 930 |
| 1 1/4-7 | 1120 | 840 | 1815 | 1360 | 1750 | 1315 |
| 1 3/8-6 | 1470 | 1100 | 2380 | 1780 | 2315 | 1735 |
| 1 1/2-6 | 1950 | 1460 | 3160 | 2370 | 3040 | 2280 |

COMMENTS:

A) Torque values specified are for bolts with residual oils or no special lubricants applied. If special lubricants of high stress capacity (such as Never-Seez, graphite and oil, molybdenum disulphite, colloidal copper or white lead) are applied, multiply the torque values in charts by 0.90. The use of Loctite does not affect the torque values in charts.

B) All values are in Foot-Pounds (FTLB). Multiply by 12 for Inch-Pounds.

C) Flat washers of equal strength must be used.

D) Bolt manufacturer's specs should be used when available.

E) Plated values in charts are for Cadmium. Multiply by 1.87 for Zinc.

F) Never re-use a highly stressed, torqued fastener: IT MAY FAIL!

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 12/29/99 | ADDED RECOMMENDED TORQUE CHART | LOR | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

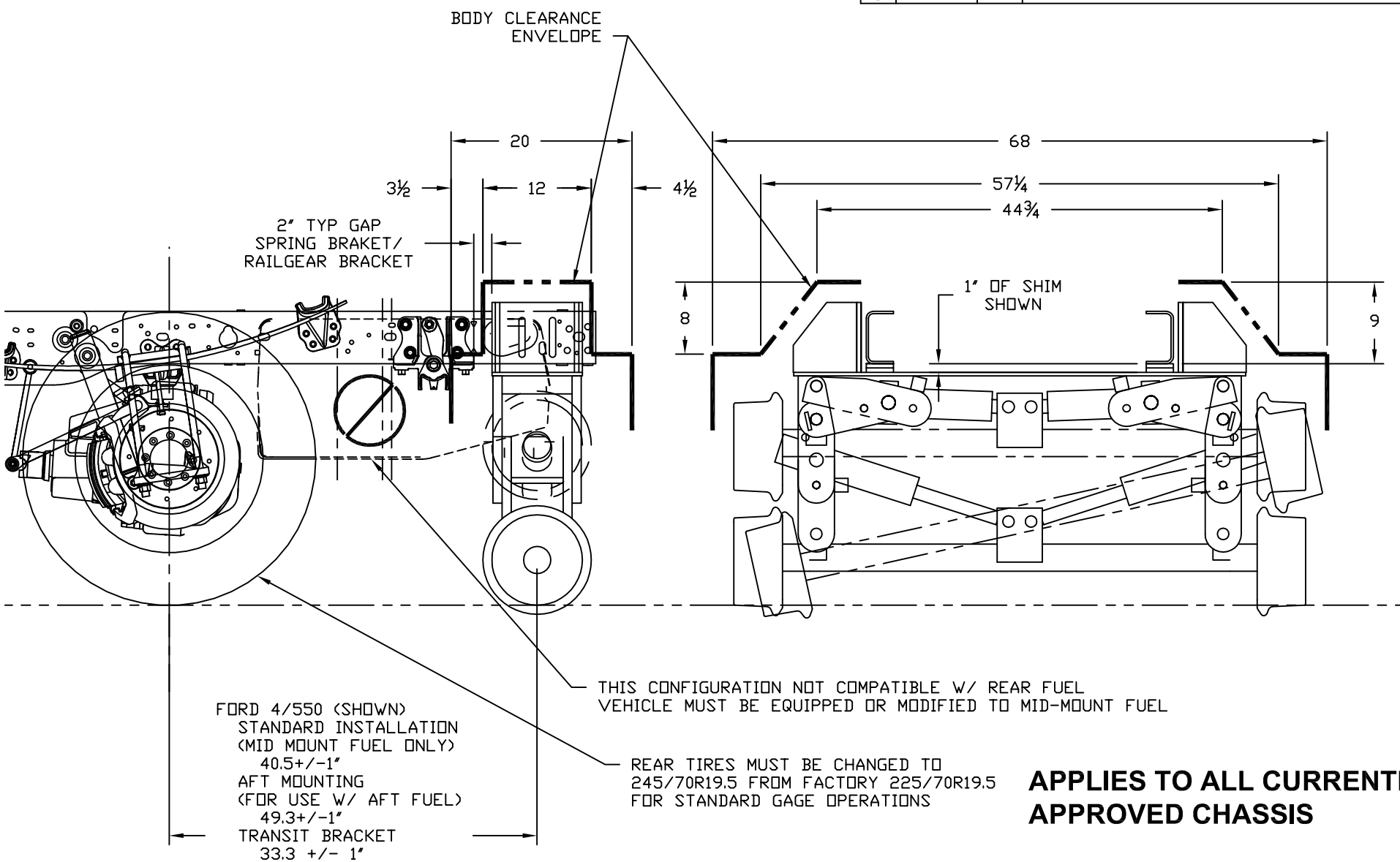
DRAWN BY: TSH
APPD BY:
DATE: 06/02/94

TITLE: PRODUCTION PROCEDURE 006 FASTENER TORQUE SPECIFICATION

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

DRAWING NUMBER: PP006
REV: A

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |




FORD 4/550 (SHOWN)
STANDARD INSTALLATION
(MID MOUNT FUEL ONLY)
40.5+/-1"
AFT MOUNTING
(FOR USE W/ AFT FUEL)
49.3+/-1"
TRANSIT BRACKET
33.3 +/- 1"
DODGE 45/5500
40.0+/-1"
AFT MOUNTING
56.0+/-1"
GM 45/5500
39.0+/-1"

**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC. MACH ± 1/32"
FRAC. OTHER ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES + .015
ANGULAR ± 1°
SURF FINISH 125 MICRO
THREADS 2A AND 2B
BREAK SHARP EDGES ( 0.030 X 45° MAX )

RW-1019

TITLE: MANUAL, RW-1019 REAR BODY CLEARANCES

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| WAK | | 12/15/09 | M1019131 | # |

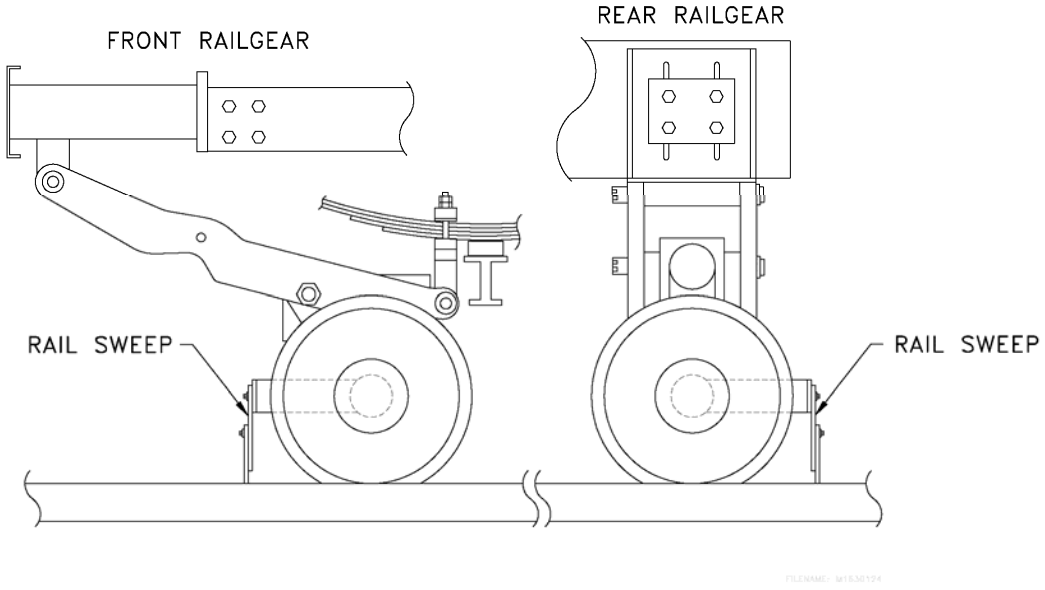
### 5.2.1 Option Literature

This document is provided to give installation, orientation and maintenance information on the varying options available for the 1019 series of Railgear. For detailed drawings of these options, refer to the corresponding numbers in Section 5.2.

### 5.2.2 Rail Sweeps

The components that make up the standard Front and Rear Rail Sweeps for Railgear without any brakes are different than Rail Sweeps for Railgear with Cobra Hydraulic Brakes. Refer to drawing in section 5.2.2 for Rail Sweep variations.

Installation of Rail Sweeps is done while the Railgear is in the rail position. For standard Rail Sweeps (without brakes), weld the Mounting Bracket directly to the Railgear axle tube oriented so that the Rubber is flush with the rail. For Rail Sweeps with Cobra Brakes, bolt the shorter Mounting Bracket directly to the Brake structure. On the front, bolt on the side facing forward; on the rear, bolt to the top of the Brake (which faces backward).




### 5.2.3 Options: Rear Retention Systems

See Section 5.2.3 for Drawing.

### 5.2.4 Options: Front Retention Systems

See Section 5.2.4 for Drawing.

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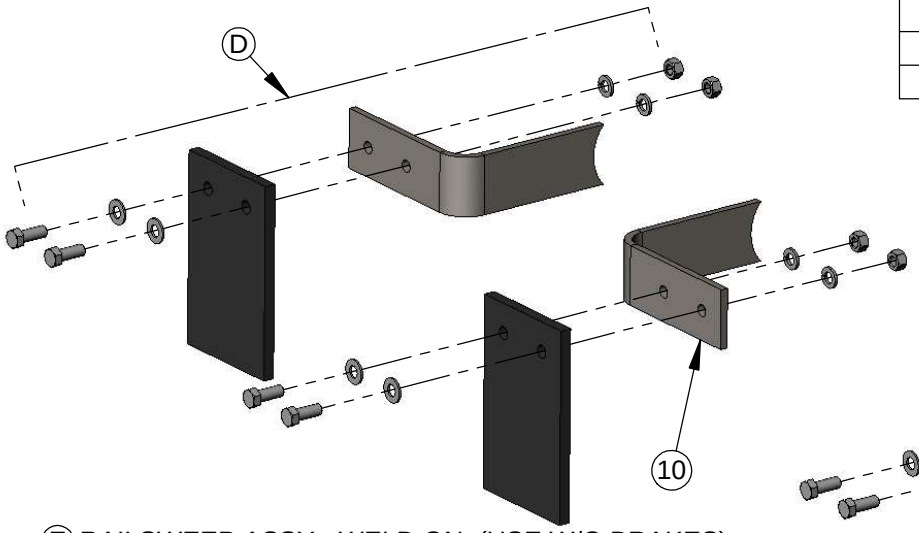
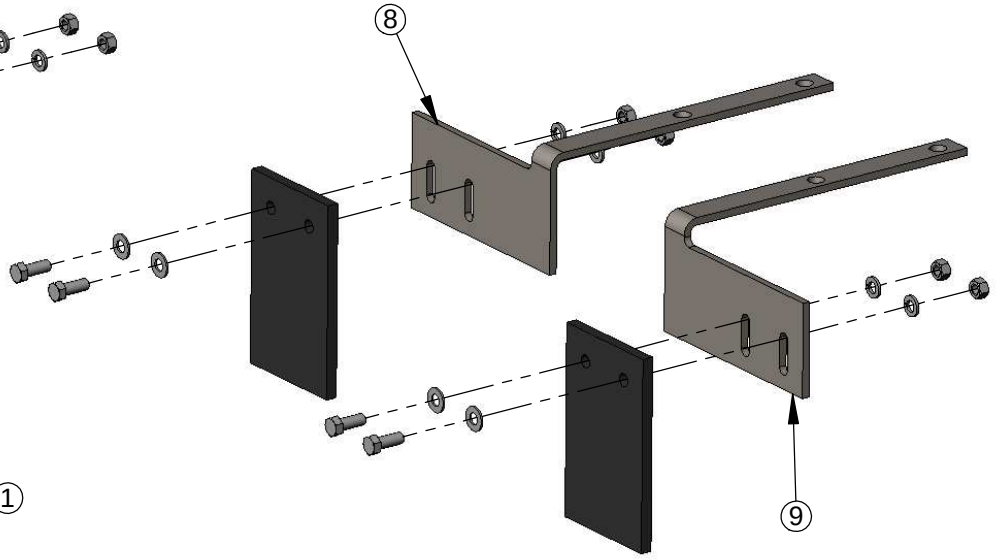
| ITEM | PART # | QTY. | DESCRIPTION |
|---|---|---|---|
| A | 12482 | 1 | RAILSWEEP ASSEMBLY FRONT RH |
| B | 12483 | 1 | RAILSWEEP ASSEMBLY FRONT LH |
| C | 12476 | 1 | RAILSWEEP ASSEMBLY FRONT AXLE SET |
| D | 10037 | 1 | RAILSWEEP ASSEMBLY (SINGLE) (WELD ON) |
| E | 10053 | 1 | RAILSWEEP ASSEMBLY AXLE SET (WELD ON) |
| F | 12491 | 1 | RAILSWEEP ASSEMBLY REAR AXLE SET (BOLT ON) |
| RAILSWEEP ASSEMBLY VARIATIONS | | | |

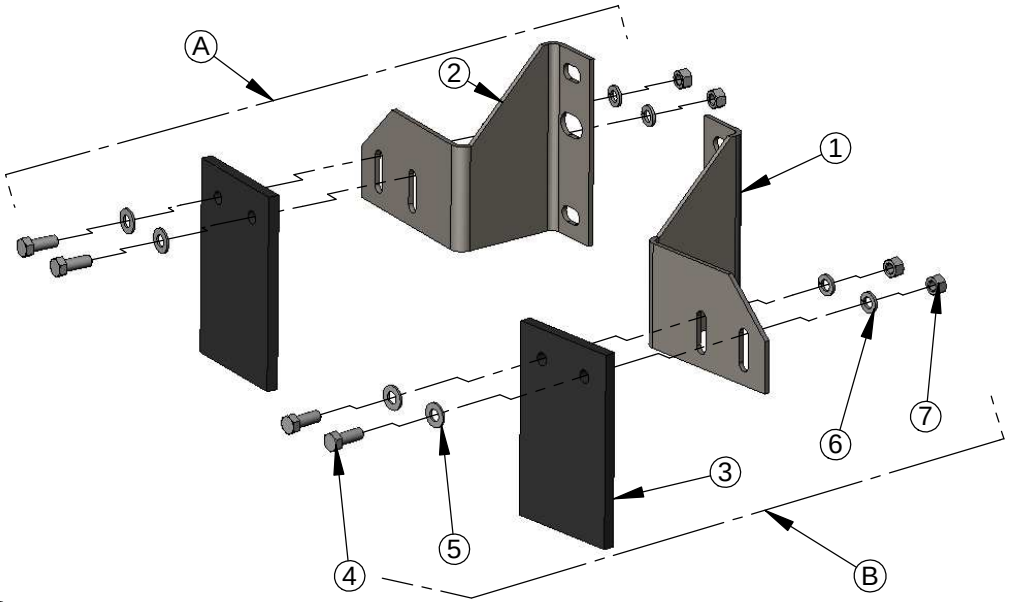
| ITEM | PART # | DESCRIPTION |
|---|---|---|
| 1 | 12470 | RAILSWEEP MOUNTING BRACKET FRONT LH (W/BRAKES) |
| 2 | 12471 | RAILSWEEP MOUNTING BRACKET FRONT RH (W/BRAKES) |
| 3 | 818503 | RAILSWEEP RUBBER PAD |
| 4 | 12475 | MOUNTING BOLTS (HHCS3/8-16X1) |
| 5 | 818508 | 3/8" FLAT WASHER |
| 6 | 818520 | 3/8 LOCK WASHER |
| 7 | 106243 | 3/8-16 HEX HEAD NUT |
| 8 | 818626 | RAILSWEEP MOUNGTING BRACKET REAR LH (W/BRAKES) |
| 9 | 818627 | RAILSWEEP MOUNGTING BRACKET REAR RH (W/BRAKES) |
| 10 | 10042 | RAILSWEEP MOUNTING BRACKETS REAR EITHER SIDE (WELD ON) |




Ⓔ RAILSWEEP ASSY - WELD ON (USE W/O BRAKES)




Ⓕ REAR RAILSWEEP ASSY - BOLT ON (USE W/BRAKES)




Ⓒ FRONT RAILSWEEP ASSY - BOLT ON (USE W/ BRAKES)

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES (0.030 X 45° MAX.)

-

DRAWN BY: NEH

APPD BY:

TITLE: RAILSWEEP OPTIONS AND PARTS DIAGRAM, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 4/29/11

DRAWING NUMBER: M1019121

REV: #

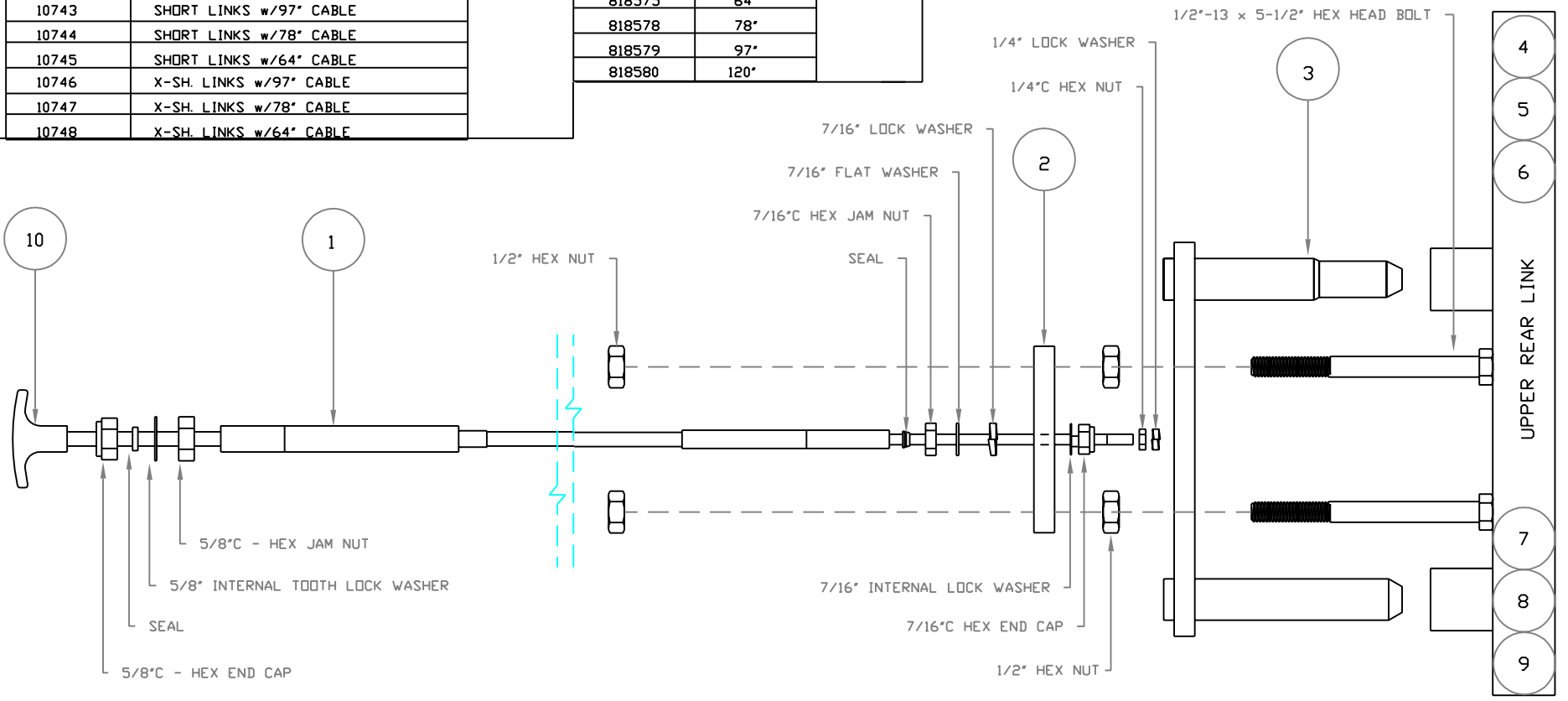
NOTE #2:
KIT INCLUDES ALL PARTS NEEDED TO CONVERT
MANUAL P/O's TO REMOTE CABLE OPERATED P/O's

| REMOTE PINOFF RETRO KITS | |
|---|---|
| P\N | DISCRIPTION |
| 10740 | LONG LINKS w/97" CABLE |
| 10741 | LONG LINKS w/78" CABLE |
| 10742 | LONG LINKS w/64" CABLE |
| 10743 | SHORT LINKS w/97" CABLE |
| 10744 | SHORT LINKS w/78" CABLE |
| 10745 | SHORT LINKS w/64" CABLE |
| 10746 | X-SH. LINKS w/97" CABLE |
| 10747 | X-SH. LINKS w/78" CABLE |
| 10748 | X-SH. LINKS w/64" CABLE |

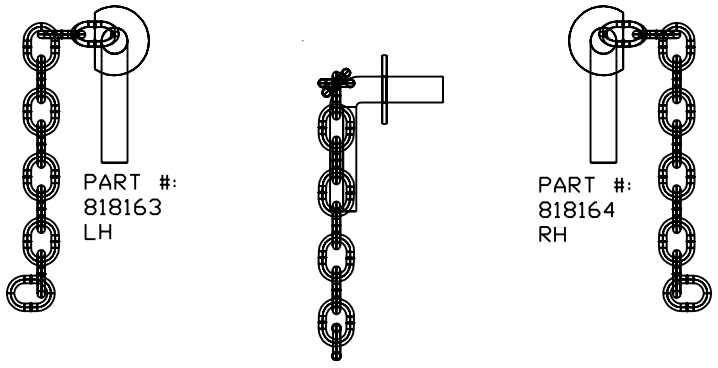
NOTE #1:
SPECIFY THE CABLE THAT
BEST FITS YOUR APPLICATION.

| REPLACEMENT CABLES | |
|---|---|
| P/N | LENGTH |
| 818581 | 30" |
| 818577 | 41" |
| 818576 | 50" |
| 818575 | 64" |
| 818578 | 78" |
| 818579 | 97" |
| 818580 | 120" |

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | NOTE 1 | 1 | REMOTE PIN-OFF CABLE (MORSE) |
| 2 | 818563 | 1 | REMOTE PIN-OFF MOUNTING PLATE |
| 3 | 818582 | 1 | REMOTE PIN-OFF ASSY. (5-3/8")(1019/1212/1420) |
| 4 | 10772 | 1 | LONG UPPER DRIVER REAR REMOTE LINK |
| 5 | 10773 | 1 | LONG UPPER PASSENGER REAR REMOTE LINK |
| 6 | 10774 | 1 | SHORT UPPER DRIVER REAR REMOTE LINK |
| 7 | 10775 | 1 | SHORT UPPER PASSENGER REAR REMOTE LINK |
| 8 | 10776 | 1 | X-SHORT UPPER DRIVER REAR REMOTE LINK |
| 9 | 10777 | 1 | X-SHORT UPPER PASSENGER REAR REMOTE LINK |
| 10 | 818571 | 1 | REMOTE PIN-OFF "T-HANDLE" (MORSE) |




MANUAL PIN/OFFS




| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES:
(UNLESS SPECIFIED)
COMMON SENSE PREVAILS
FRAC. MACH: ± 1/32"
FRAC. OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

DRAWN BY: NEH
APPD BY:

TITLE:
MANUAL, REAR RAILGEAR RETENTION OPTIONS-RW1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

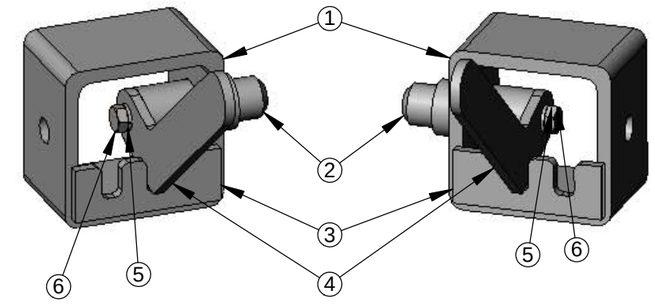
DATE: 5/2/11

DRAWING NUMBER: M1019123

REV: #

LEVER PIN-OFF
DRIVER SIDE: 818890

PASSENGER SIDE: 818891

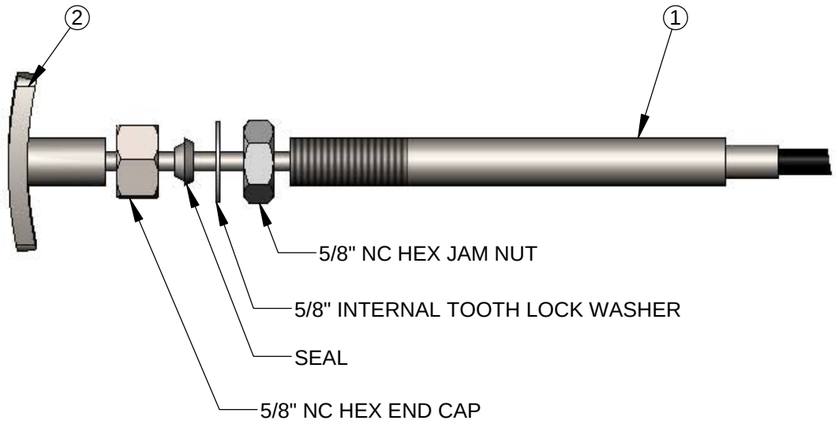


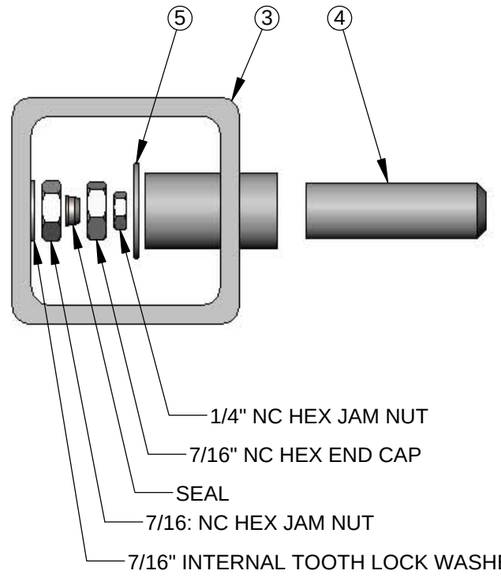

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 818785 | 1 | REMOTE PINOFF WELDMENT |
| 2 | 818766 | 1 | RW-1630 CABLE REMOTE PINOFF PIN DETAIL, FRONT |
| 3 | 818893 | 1 | STOP BAR, 1019 LEVER PINOFF |
| 4 | 818892 | 1 | LEVER DETAIL, 1019 LEVER PINOFF |
| 5 | 82654 | 1 | 1/4" LOCK WASHER |
| 6 | 11255 | 1 | HHCS 1/4-20 UNC X 3/4" LONG |

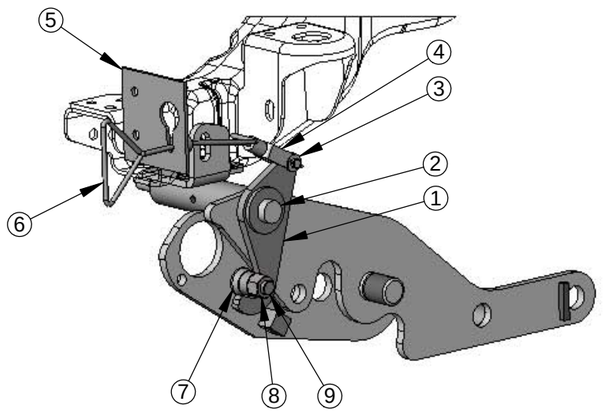
LEVER PIN-OFF RETENTION SYSTEM
STANDARD ON FORD/DODGE/STERLING
FOR RETRO-FIT OPTIONS CONTACT DMF

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 818577 | 1 | REM.P/O CABLE ASSY.,41"w/HANDLE |
| 2 | 818571 | 1 | REM.P/O PLASTIC TEE HANDLE (MORSE) |
| 3 | 818785 | 1 | REMOTE PINOFF WELDMENT |
| 4 | 818766 | 1 | REM.P/O PIN, FRONT (CABLE)(RW-1019)2-3/8" |
| 5 | 818767 | 1 | 1019 PIN OFF STOP WASHER |

CABLE REMOTE PIN-OFF RETENTION SYSTEM
AVAILABLE ACROSS PRODUCT LINE
FOR RETRO-FIT OPTIONS CONTACT DMF

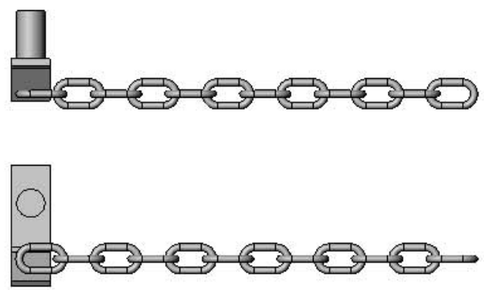





HOOK LOCK RETENTION SYSTEM
CURRENTLY AVAILABLE FOR '08 FORD F-4/550'S ONLY
FOR RETRO-FIT OPTIONS OR POSSIBLE OPTIONS
FOR OTHER CHASSIS CONTACT DMF

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 818853 | 1 | HOOK LOCK, 1019, FRONT - DETAIL |
| 2 | 818858 | 1 | HOOK LOCK PIN WELDMENT |
| 3 | FW3/4 | 2 | 3/4" FLAT WASHER, GRADE 8 |
| 4 | 818854 | 1 | CLEVIS, 9/16" THROAT, 1/2" PIN |
| 5 | 818859 | 1 | KEYHOLE PLATE |
| 6 | 818861 | 1 | PULL ROD WELDMENT, LH |
| | 818864 | - | PULL ROD WELDMENT, RH |
| 7 | 818855 | 1 | LATCH PIN, BOLT ON - HOOK LOCK |
| 8 | 241103 | 1 | 3/4-16 NF LOCKNUT |
| 9 | 818851 | 1 | 3/4-16 X 2-3/4" LONG HEX HEAD CAP SCREW |



PART #: 10168

MANUAL PIN-OFF RETENTION SYSTEM
AVAILABLE ON GM/CHEVY ONLY
FOR RETRO-FIT OPTIONS CONTACT DMF

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.005 R" MAX.)

-

TITLE: MANUAL, FRONT RETENTION OPTIONS, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 5/2/11 | M1019124 | # |

# Installation Instructions for

## The DMF Velcro® Steering Wheel Lock

Overview: The DMF Velcro® steering wheel lock consists of two 2" wide adhesive backed "hook" strips and a 4" wide piece of "loop" fabric. A piece of adhesive backed hook is placed on the steering wheel column and a second piece placed on the top flat of the steering wheel hub. The 4" wide piece of loop fabric can then be applied to bridge the gap between column and wheel preventing the front tires from accidentally being turned while on the rail. However, in the event of an emergency, the steering wheel can be forcibly turned and the Velcro fasteners will separate allowing the driver to steer the vehicle.

1) Clean the areas where the self adhesive 2" wide "hook" strips will be applied on the steering column and wheel with rubbing alcohol and a clean cloth.
2) Allow the column and wheel to dry.
3) Remove the adhesive backing from the "hook" strips and apply them to the top of the steering wheel hub and the column as close to the wheel-column gap as possible. NOTE: Trim the strips to fit around obstructions such as hazard light switches.

4) Allow the adhesive to cure for 24 hours prior to attaching the 4" loop fabric.
5) When putting the truck on the rail, position the 4" loop fabric to bridge the gap between the hooks on both the column and wheel as shown below and press firmly.

6) To remove the lock, simply pull on the 'D' ring and store the piece of Velcro fabric.

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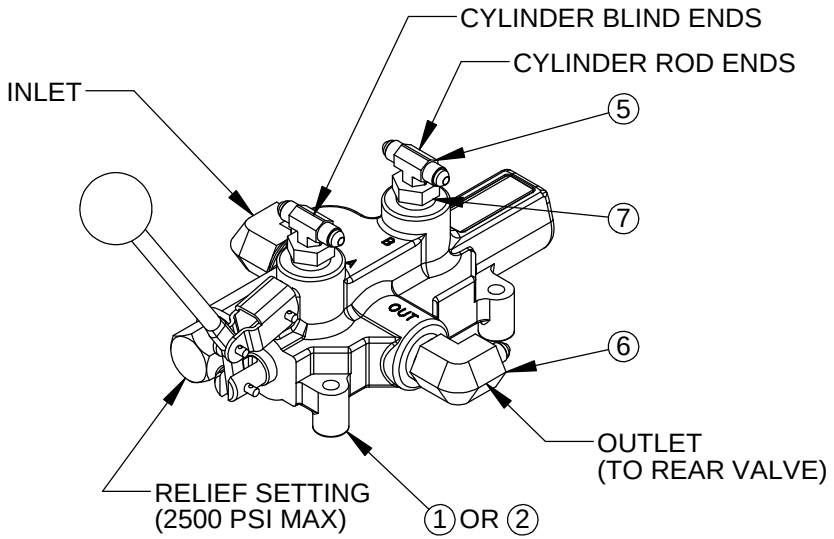
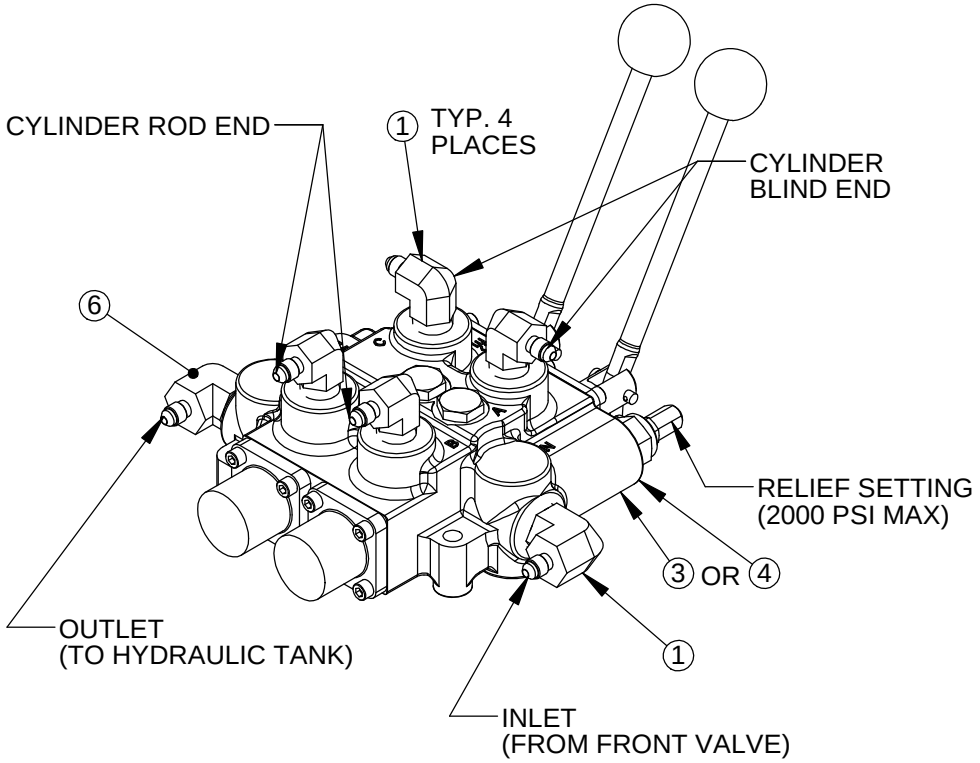
| ITEM | PART # | DESCRIPTION |
|---|---|---|
| 1 | 10288 | FRONT ENERGY VALVE, W/ FITTINGS |
| 2 | 810206 | FRONT ENERGY VALVE, W/O FITTINGS |
| 3 | 810211 | REAR ENERGY VALVE, W/ FITTINGS |
| 4 | 810212 | REAR ENERGY VALVE, W/O FITTINGS |
| 5 | 810308 | FITTING, 1/4" MPT RISE X #4 MJIC RUNS, TEE |
| 6 | 810301 | FITTING, 3/4" MPT X #4 MJIC 90 DEG |
| 7 | 810306 | FITTING, 1/2" MPT X 1/4" FPT ADAPTER |

| ITEM | PART # | DESCRIPTION |
|---|---|---|
| 8 | 810304 | FITTING, 1/2" MPT X #4 MJIC 90 DEG. |
| 9 | 810242 | GRESEN DIVERTOR VALVE (S-50) |
| 10 | 810232 | GRESEN DIVERTOR VALVE (S-75) |
| 11 | 810226 | GRESEN DIVERTOR VALVE (S-100) |

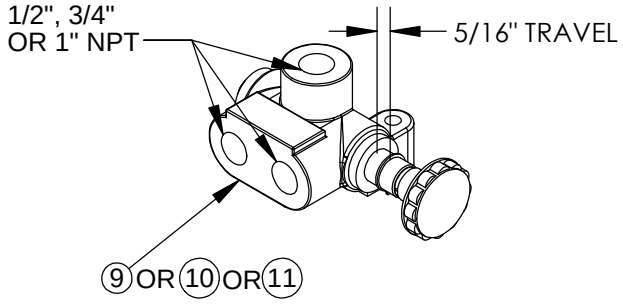
## FRONT ENERGY VALVE




## REAR ENERGY VALVE




## DIVERTER VALVE




| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 5/24/11 | REDRAWN IN SOLIDWORKS, UPDATED TO CURRENT PART #'S AND PRODUCTION | NEH | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX)

-

DRAWN BY: NEH
APPD BY:

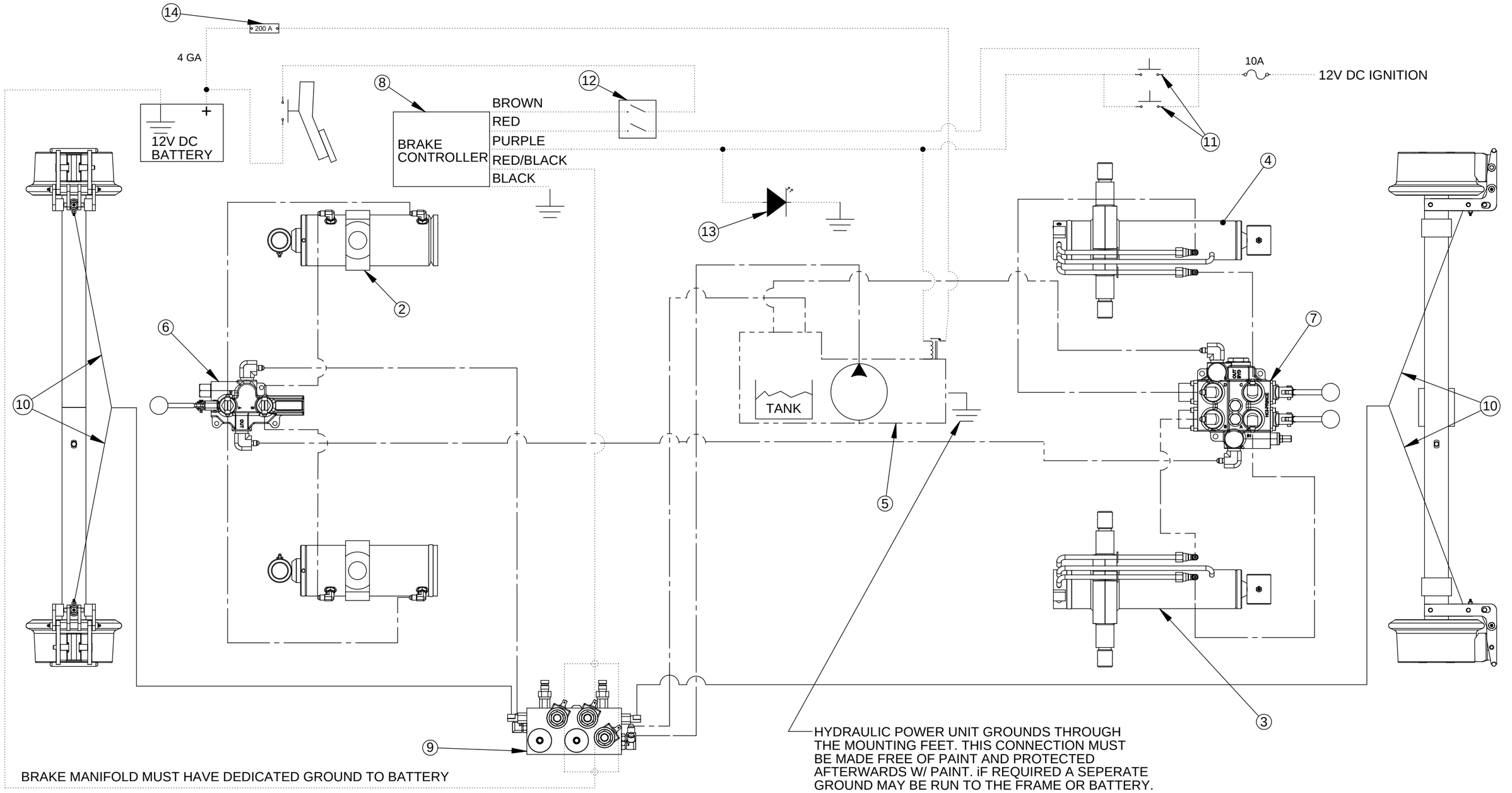
TITLE: MANUAL, VALVE ASSEMBLIES AND PARTS DIAGRAM, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 5/2/11

DRAWING NUMBER: M1019125

REV: A




| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 240800 | 1 | DRIVER'S SIDE FRONT CYLINDER |
| 2 | 240801 | 1 | PASSENGER'S SIDE FRONT CYLINDER |
| 3 | 241504 | 1 | DRIVER'S SIDE REAR CYLINDER |
| 4 | 241503 | 1 | PASSENGER'S SIDE REAR CYLINDER |
| 5 | 10752 | 1 | MONARCH POWER UNIT |
| 6 | 10288 | 1 | FRONT VALVE WITH FITTINGS |
| 7 | 810211 | 1 | REAR VALVE WITH FITTINGS |

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 8 | 10483 | 1 | RW-1019 HYDRAULIC BRAKE CONTROLLER |
| 9 | 10501 | 1 | BRAKE MANIFOLD W/ FITTINGS, F & R BRAKES |
| 10 | 10442 | 4 | STAINLESS STEEL BRAKE LINE (1/4" X 48") |
| 11 | 10758 | 2 | SWITCH, PUSHBUTTON: COLE HERSEE 90030-12 |
| 12 | 10417 | 1 | SWITCH, TOGGLE DPST-7803K31 |
| 13 | 18611 | 1 | LED INDICATOR LIGHT |
| 14 | 605309 | 1 | CIRCUIT BREAKER, 200 AMP |

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 5/23/14 | ADDED ITEM 14, REDRAWN | JDI | |
| B | 6/28/11 | REVISE PUMP GROUNDING, ADDED NOTES | WAK | |
| A | 5/24/11 | REDRAWN IN SOLIDWORKS, REVISED TO CURRENT PART #'S AND PRODUCTION | NEH | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.010/.5 45° MAX.)

-

DRAWN BY: NEH
APPD BY:

TITLE: MANUAL, HYDRAULIC SYSTEM W/ LOCKING VALVES AND TIMER, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

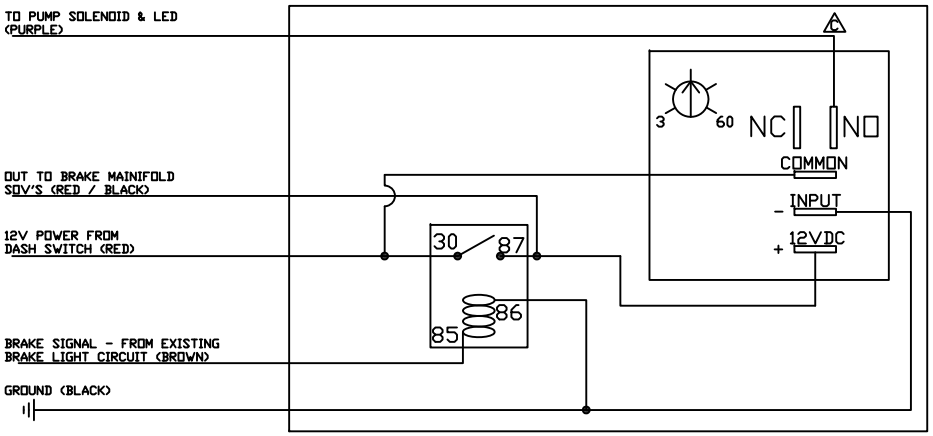
DATE: 5/2/11

DRAWING NUMBER: M1019126

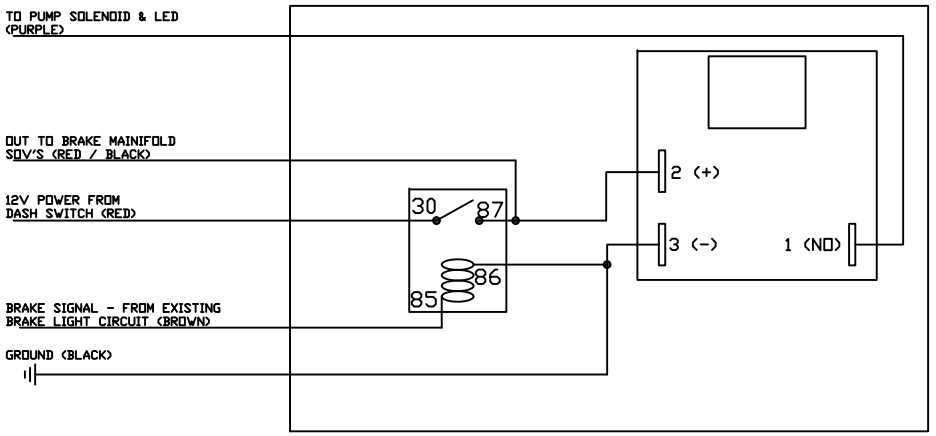
REV: C

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | HAMMOND 1591TSBK | 1 | 1019 BRAKE CONTROLLER BOX |
| 2 | 10486 | 1 | TIMER |
| A 3 | HE87416 | 1 | MICRO RELAY - HELLA 87416 |
| A 4 | HE87125 | 1 | MICRO 5 TERMINAL MOUNT CON BLK - HELLA 87125 |
| 5 | TERMINAL-HELLA87272 | 4 | TERMINAL-HELLA87272 |
| | | | |

NCC TIMER (PART # Q4T-00060-346)
- TIMER IS RED IN COLOR
- HAS ADJUSTMENT DIAL (3-60 SEC)
- 5 TERMINALS




B AIROTRONICS TIMER (PART # TGLB730SC2H)
- TIMER IS BLACK IN COLOR
- NO ADJUSTMENT DIAL (FIXED 30 SECONDS)
- 3 TERMINALS




NOTES: 1) RELAY SHOWN IN DE-ENERGIZED STATE.
2) SET TIMER TO APPROXIMATELY 30 SECONDS.
3) NUMBERS ON RELAY DENOTE SPADE TERMINAL NUMBERS.
4) REFERENCE HD10481C FOR SYSTEM WIRING DETAILS.

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| D | | | | |
| C | 8/22/11 | FIXED ERROR FROM REV B: PURPLE ON NCC TIMER WENT TO NC | BJF | |
| B | 1/7/11 | ADDED AIROTRONICS OPTION | BJF | |
| A | 2/25/09 | HE87416 WAS HE87401; HE87125 WAS HE87122 | BJF | |

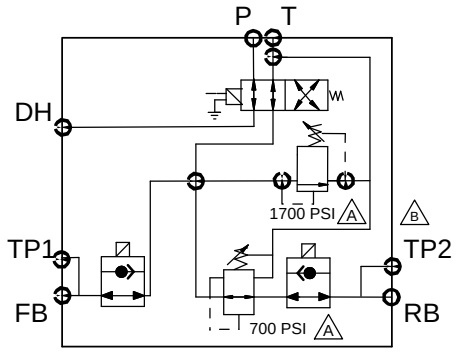
TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES ( 0.030 X 45° MAX )

RW-1019

TITLE: RW-1019 / 1212 HYDRAULIC BRAKE CONTROLLER

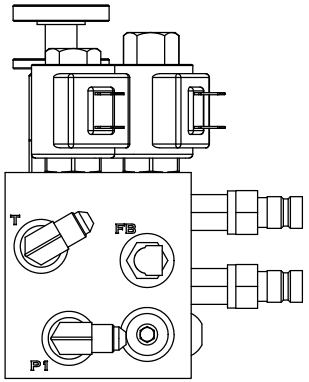
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

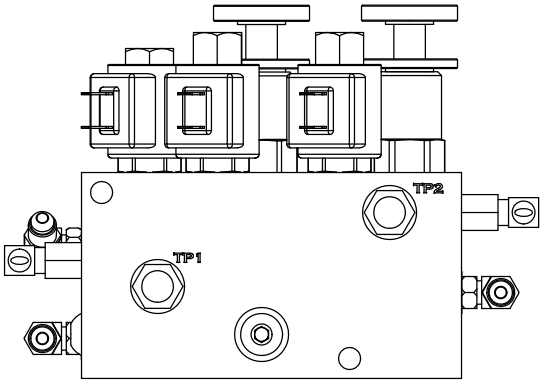
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| SEW | | 9/7/03 | 10483 | C |

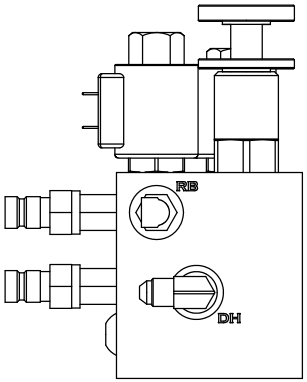



CIRCUIT DIAGRAM

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 10491 | 1 | FRONT RELIEF VALVE |
| 2 | 10469 | 1 | REAR RELIEF VALVE |
| 3 | 10471 | 1 | BRAKE CIRCUIT ENABLE VALVE (CARTRIDGE ONLY) |
| 4 | 10472 | 2 | BRAKE LOCKING VALVE (CARTRIDGE ONLY) |
| 5 | 500727 | 3 | VALVE SOLENOID |
| 6 | 10438 | 2 | DIAGNOSTIC NIPPLE |
| 7 | 10470 | 4 | ADAPTER, 1/4 MORB X 1/8 FPT |
| 8 | 10432 | 2 | BRAKE LINE ELBOW, 1/8 MPT X 1/8 INV. FLARE |
| 9 | 10457 | 3 | 1/4 MORB X #4 MJIC 90 DEG. ELBOW |

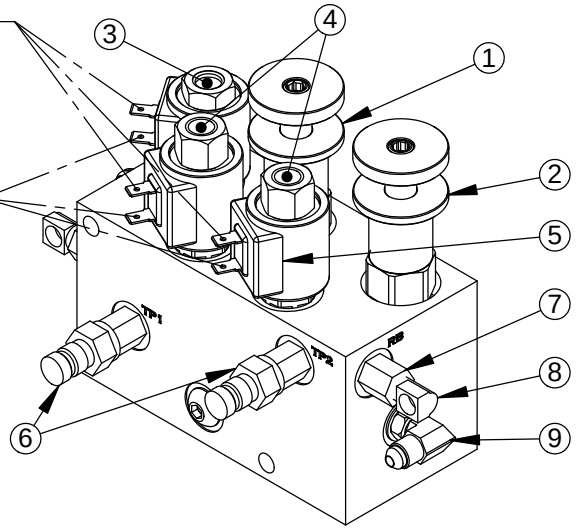



TO RED/BLACK OUTPUT FROM BRAKE CONTROLLER

DEDICATED GROUND TO BATTERY




| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | 7/2/14 | 1700 PSI WAS 1800 PSI | JDI | |
| A | 10/21/13 | ADDED 1800 PSI, 700 PSI | JDI | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES ( 0.030 X 45° MAX )

-

DRAWN BY: NEH

APPD BY:

TITLE: MANUAL, BRAKE VALVE MANIFOLD ASSY (F&R), HYDRAFORCE, RW-1019

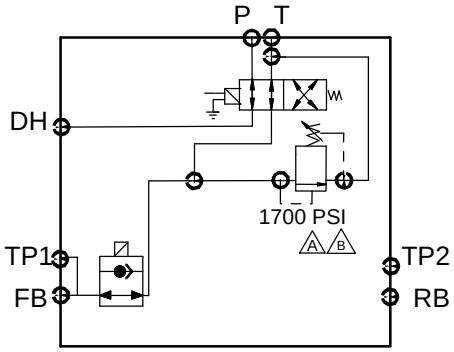
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 5/20/11

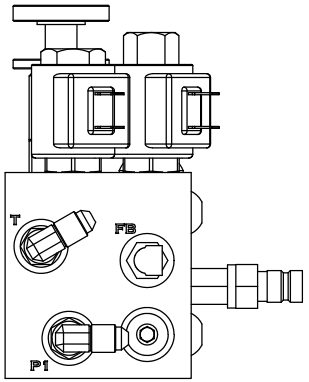
DRAWING NUMBER: M1019135

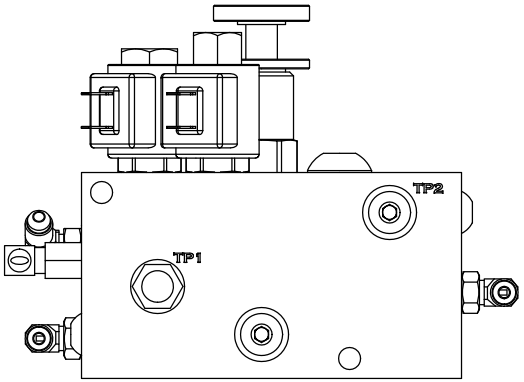
REV: B

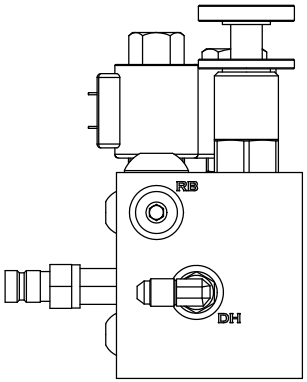
| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 10491 | 1 | FRONT RELIEF VALVE |
| 2 | 10471 | 1 | BRAKE CIRCUIT ENABLE VALVE (CARTRIDGE ONLY) |
| 3 | 10472 | 2 | BRAKE LOCKING VALVE (CARTRIDGE ONLY) |
| 4 | 500727 | 3 | VALVE SOLENOID |
| 5 | 10438 | 1 | DIAGNOSTIC NIPPLE |
| 6 | 10470 | 2 | ADAPTER, 1/4 MORB X 1/8 FPT |
| 7 | 10432 | 1 | BRAKE LINE ELBOW, 1/8 MPT X 1/8 INV. FLARE |
| 8 | 10457 | 3 | 1/4 MORB X #4 MJIC 90 DEG. ELBOW |

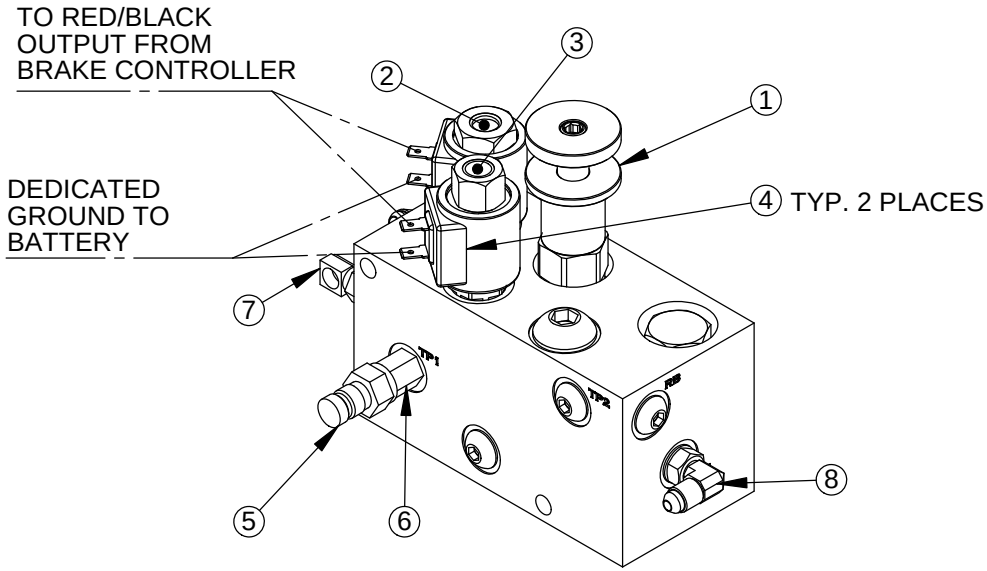



CIRCUIT DIAGRAM




| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 12/2/14 | CORRECTED QUANTITIES OF 10438, 10470, 10432 | BJF | |
| B | 7/2/14 | 1700 PSI WAS 1800 PSI | JDI | |
| A | 10/21/13 | ADDED 1800 PSI | JDI | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES ( 0.030 X 45° MAX )

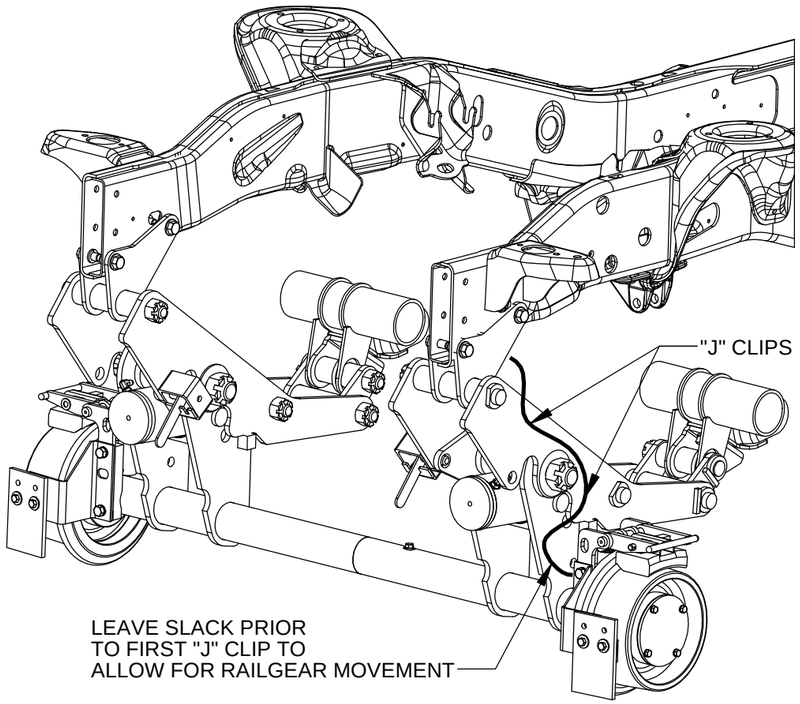
RW-1019

TITLE: MANUAL, BRAKE VALVE MANIFOLD ASSY (F ONLY), HYDRAFORCE, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

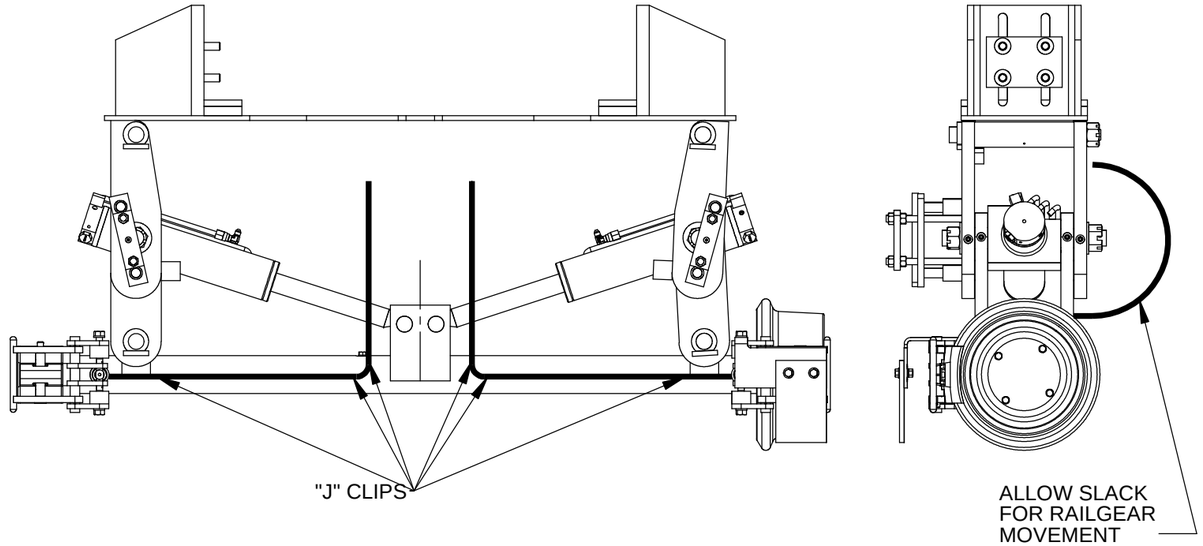
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 5/23/11 | M1019137 | C |

NOTE:
PLUG WELD "J" CLIPS IN PLACE AND CAREFULLY ACTUATE RAILGEAR TO ENSURE PROPER CLEARANCE AROUND ALL HYDRAULIC LINES.




FRONT BRAKE LINE SCHEMATIC
GENERAL ARRANGEMENT APPLIES TO ALL CHASSIS TYPES
(DODGE/STERLING SHOWN)

NOTE:
PLUG WELD "J" CLIPS IN PLACE AND CAREFULLY ACTUATE RAILGEAR TO ENSURE PROPER CLEARANCE AROUND ALL HYDRAULIC LINES.




REAR BRAKE LINE SCHEMATIC
GENERAL ARRANGEMENT APPLIES TO ALL CHASSIS TYPES

**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

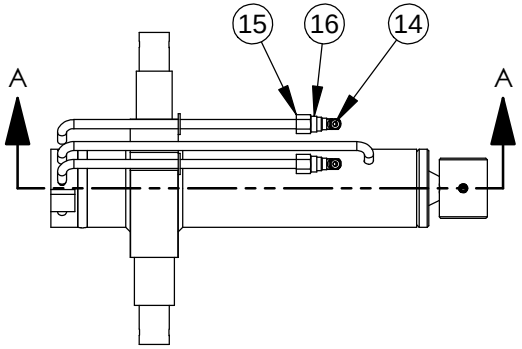
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.030 X 45° MAX.)

-

TITLE: MANUAL, COBRA BRAKE HYDRAULIC LINE INSTALLATION, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 5/4/11 | M1019129 | # |

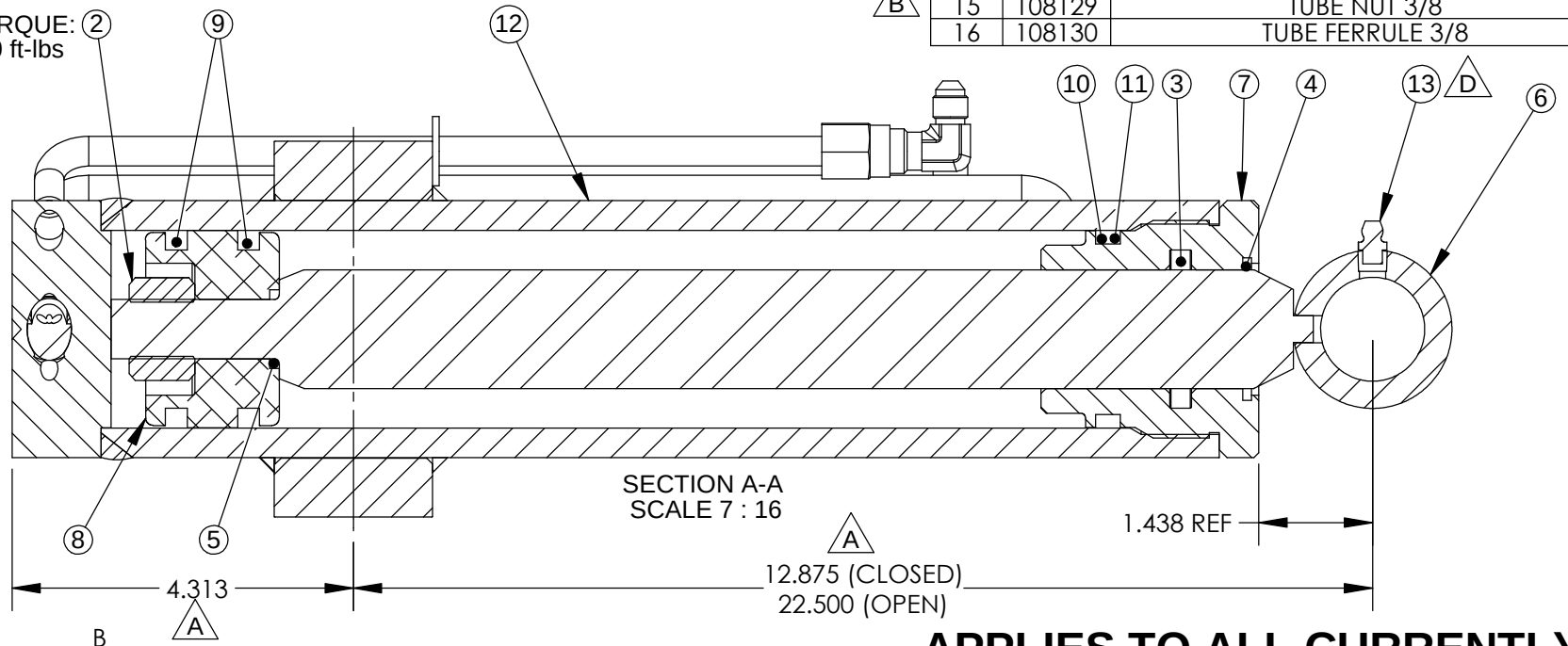



DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

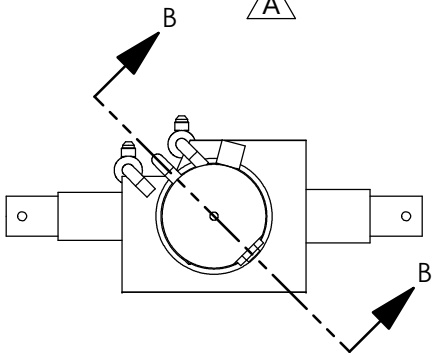
| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 241016 | PARKER LOCKING VALVE | 1 |
| 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| 3 | 241105 | ROD SEAL | 1 |
| 4 | 241106 | ROD WIPER | 1 |
| 5 | 241107 | 3/4" ORING | 1 |
| 6 | 241200 | ROD ASSEMBLY | 1 |
| 7 | 241202 | GLAND | 1 |
| 8 | 241203 | PISTON | 1 |
| 9 | 241204 | PISTON SEAL | 2 |
| 10 | 241208 | 2-1/2" ORING | 1 |
| 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| 12 | 241516 | TUBE WELDMENT | 1 |
| 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| 15 | 108129 | TUBE NUT 3/8 | 2 |
| 16 | 108130 | TUBE FERRULE 3/8 | 2 |

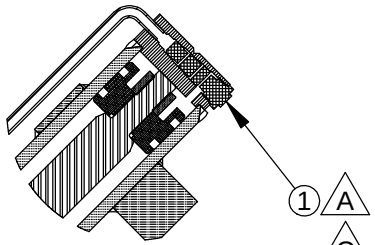
SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE

B TORQUE: 300 ft-lbs




SECTION A-A
SCALE 7 : 16




SECTION B-B
SCALE 1 : 6

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| D | 2/29/12 | 818235 WAS 240123 | JTM | |
| C | 12/1/11 | 241016 WAS 241013 | JTM | |
| B | 7/16/11 | ADDED ITEMS 14-16, ADDED TORQUE SPEC | NEH | |
| A | 5/2/11 | ADDED DIMENSIONS AND BALLOON FOR ITEM #1 | NEH | |

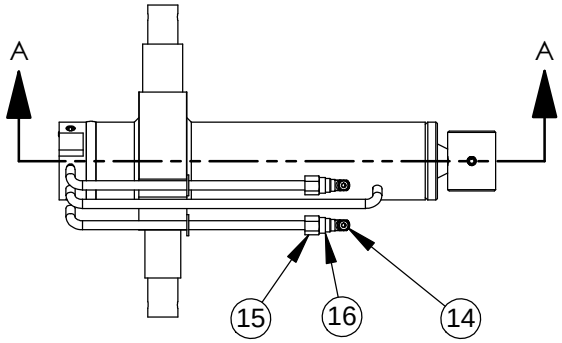
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, DRIVER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

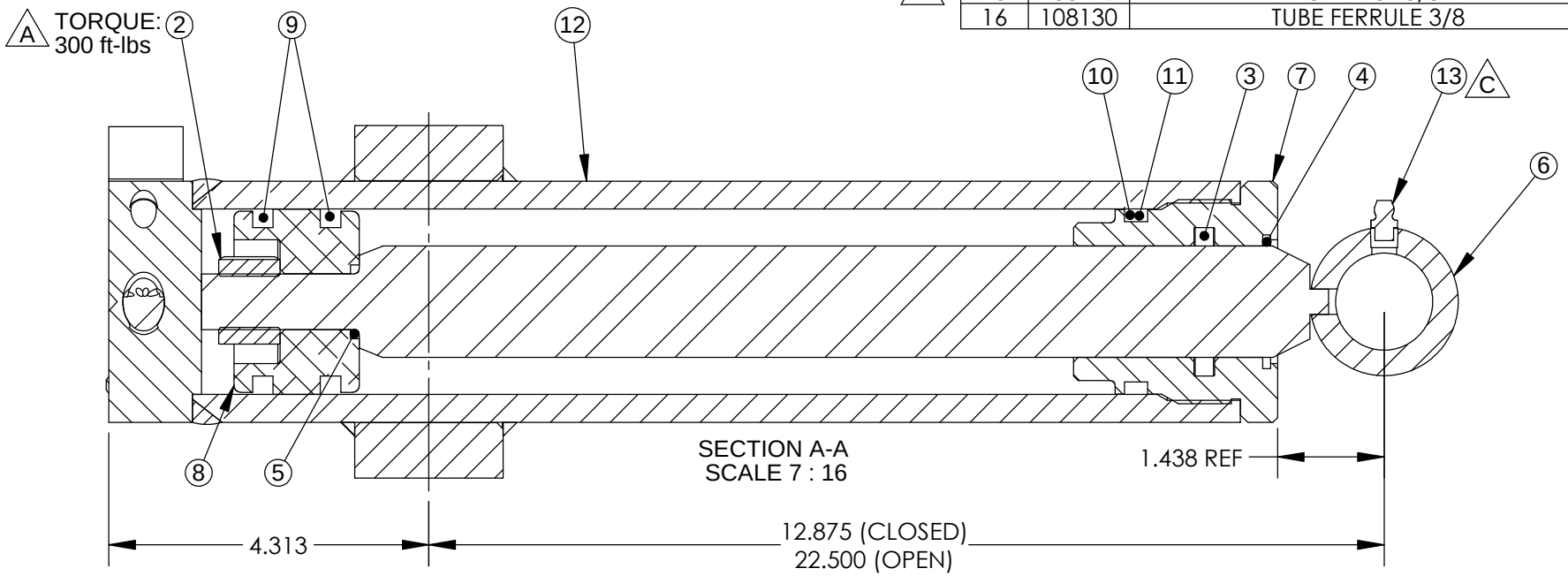
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/20/11 | 241504 | D |

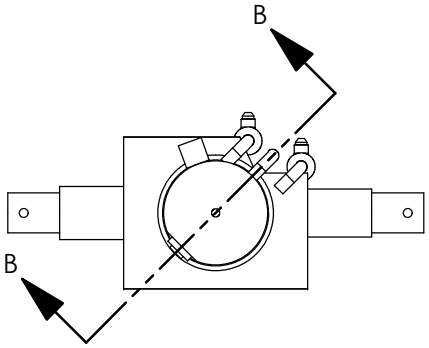


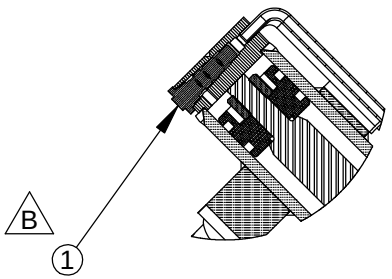

DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 241016 | PARKER LOCKING VALVE | 1 |
| 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| 3 | 241105 | ROD SEAL | 1 |
| 4 | 241106 | ROD WIPER | 1 |
| 5 | 241107 | 3/4" ORING | 1 |
| 6 | 241200 | ROD ASSEMBLY | 1 |
| 7 | 241202 | GLAND | 1 |
| 8 | 241203 | PISTON | 1 |
| 9 | 241204 | PISTON SEAL | 2 |
| 10 | 241208 | 2-1/2" ORING | 1 |
| 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| 12 | 241515 | TUBE WELDMENT | 1 |
| 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| 15 | 108129 | TUBE NUT 3/8 | 2 |
| 16 | 108130 | TUBE FERRULE 3/8 | 2 |

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE




SECTION B-B
SCALE 1 : 6

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 2/17/12 | 818235 WAS 240123 | JTM | |
| B | 12/1/11 | 241016 WAS 241013 | JTM | |
| A | 7/16/11 | ADDED ITEMS 14-16 TO BOM, ADDED TORQUE SPEC | NEH | |

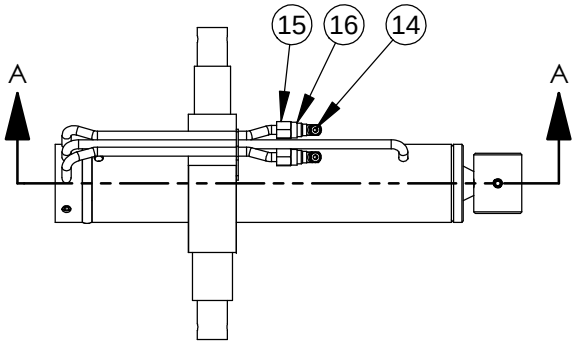
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, PASSENGER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/20/11 | 241503 | C |

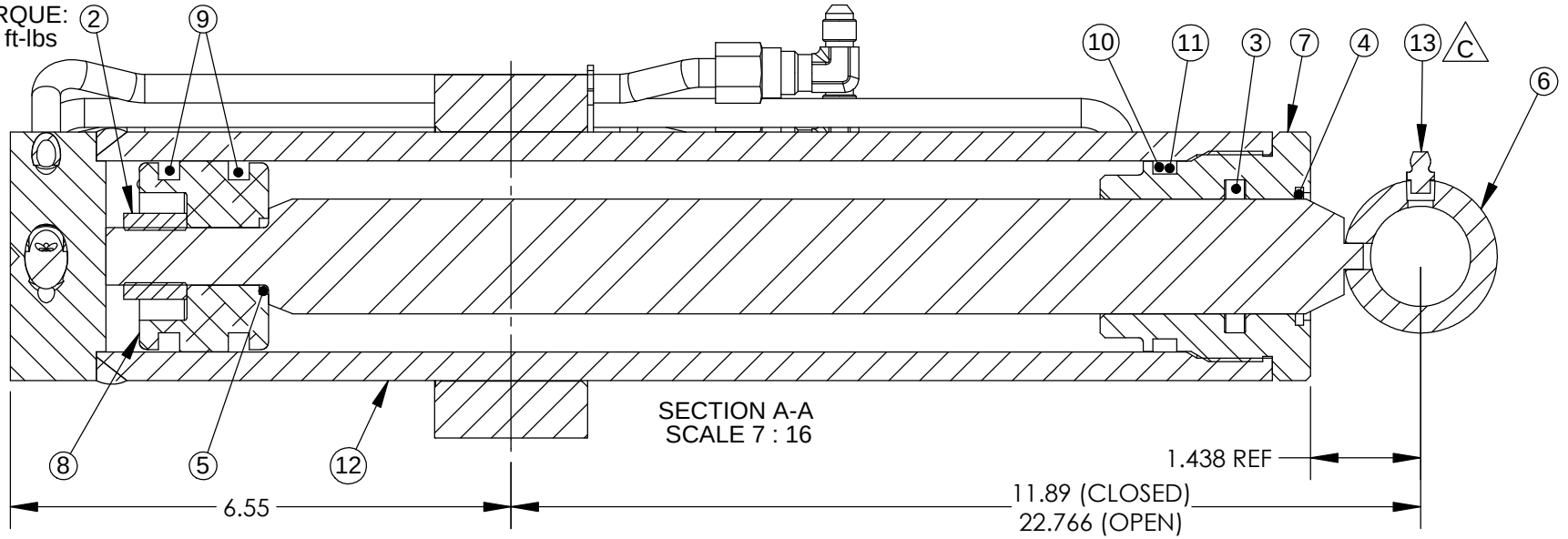


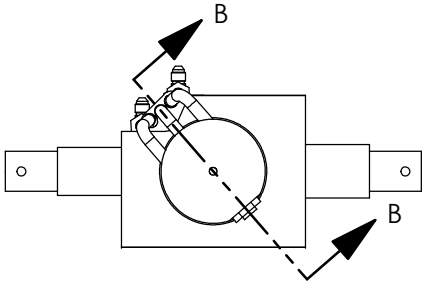

DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

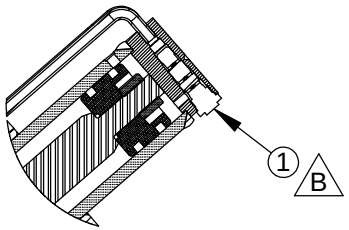
| | ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|---|
| B | 1 | 241016 | PARKER LOCKING VALVE | 1 |
| | 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| | 3 | 241105 | ROD SEAL | 1 |
| | 4 | 241106 | ROD WIPER | 1 |
| | 5 | 241107 | 3/4" ORING | 1 |
| | 6 | 241216 | ROD ASSEMBLY | 1 |
| | 7 | 241202 | GLAND | 1 |
| | 8 | 241203 | PISTON | 1 |
| | 9 | 241204 | PISTON SEAL | 2 |
| | 10 | 241208 | 2-1/2" ORING | 1 |
| | 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| | 12 | 241416 | TUBE WELDMENT | 1 |
| C | 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| | 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| A | 15 | 108129 | TUBE NUT 3/8 | 2 |
| | 16 | 108130 | TUBE FERRULE 3/8 | 2 |

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE

A TORQUE: 300 ft-lbs




SECTION B-B
SCALE 1 : 6

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 2/20/12 | 818235 WAS 240123 | JTM | |
| B | 12/1/11 | 241016 WAS 241013 | JTM | |
| A | 7/16/11 | ADDED ITEMS 14-16, ADDED TORQUE SPEC | NEH | |

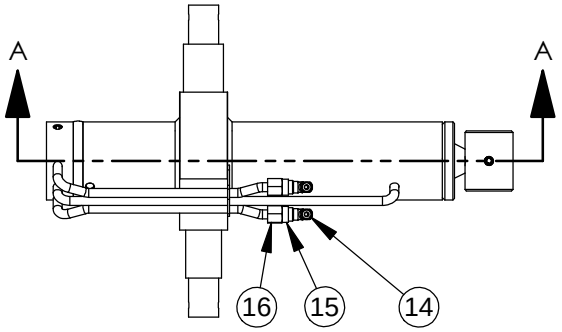
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, LONG LINKS, DRIVER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

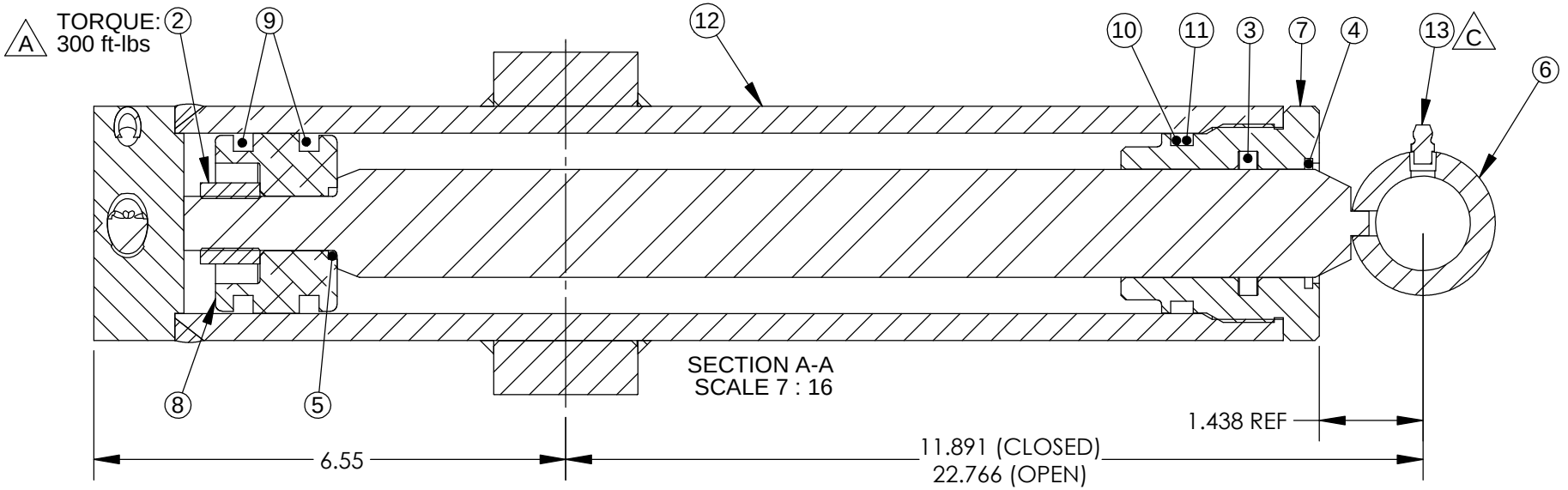
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/21/11 | 241404 | C |

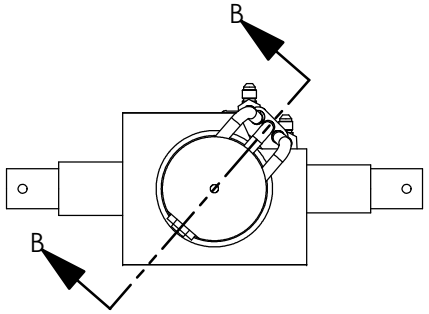


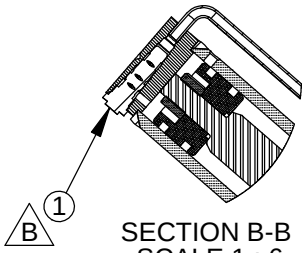

DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 241016 | PARKER LOCKING VALVE | 1 |
| 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| 3 | 241105 | ROD SEAL | 1 |
| 4 | 241106 | ROD WIPER | 1 |
| 5 | 241107 | 3/4" ORING | 1 |
| 6 | 241216 | ROD ASSEMBLY | 1 |
| 7 | 241202 | GLAND | 1 |
| 8 | 241203 | PISTON | 1 |
| 9 | 241204 | PISTON SEAL | 2 |
| 10 | 241208 | 2-1/2" ORING | 1 |
| 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| 12 | 241415 | TUBE WELDMENT | 1 |
| 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| 15 | 108129 | TUBE NUT 3/8 | 2 |
| 16 | 108130 | TUBE FERRULE 3/8 | 2 |

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE




# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 2/20/12 | 818235 WAS 240123 | JTM | |
| B | 12/1/11 | 241016 WAS 241013 | JTM | |
| A | 7/16/11 | ADDED ITEMS 14-16, ADDED TORQUE SPEC | NEH | |

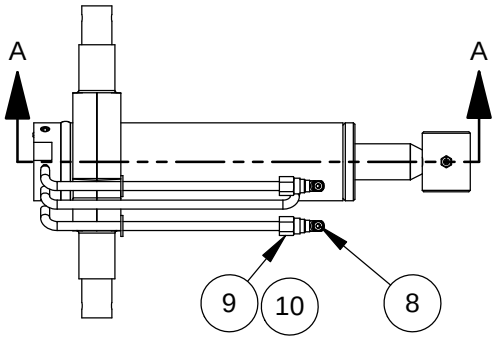
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, LONG LINKS, PASSENGER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

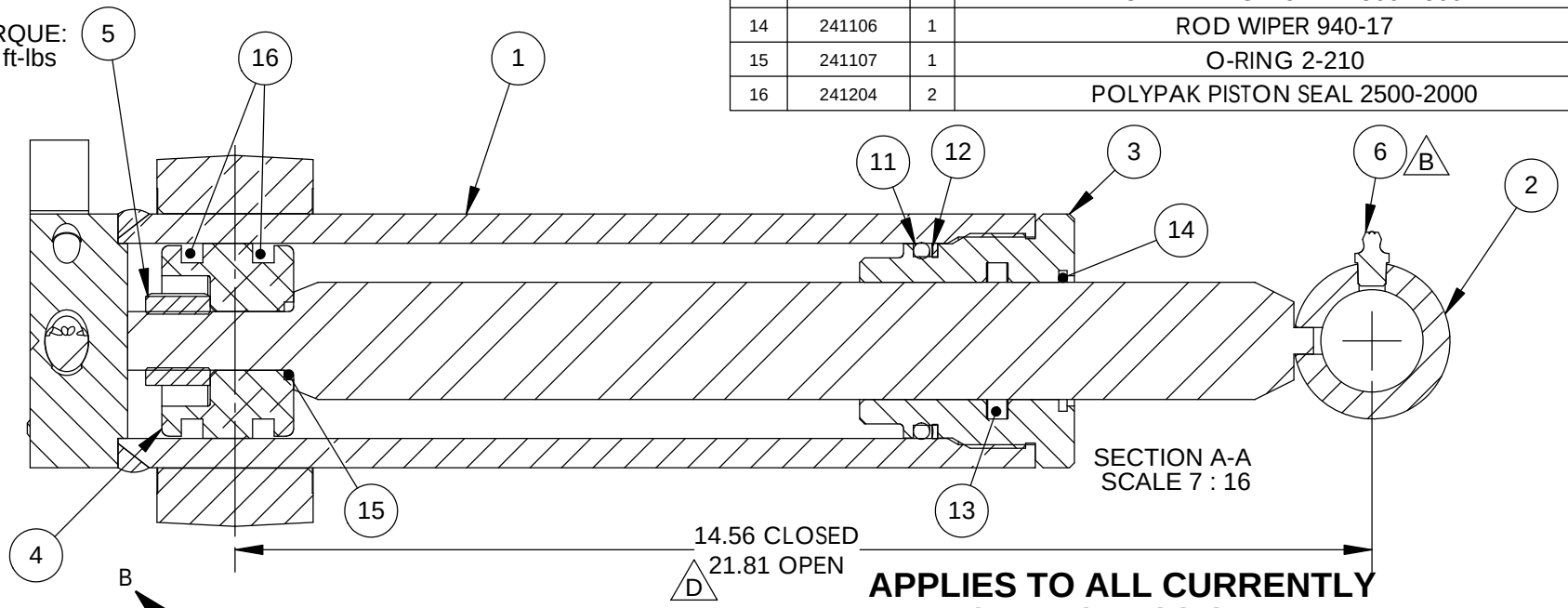
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/20/11 | 241403 | C |



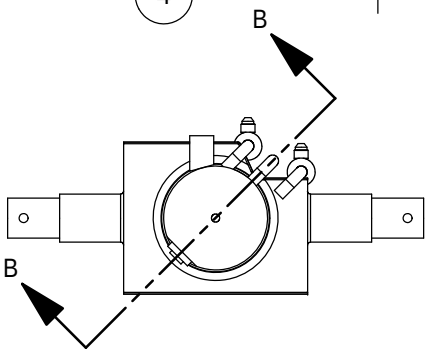

| ITEM NO. | PART NUMBER | QTY. | DESCRIPTION |
|---|---|---|---|
| 1 | 241519 | 1 | WELDMENT, 2-1/2" TUBE, LVALVE, XTRA SHORT, REAR RH |
| 2 | 241200 | 1 | 2-1/2" 1019 REAR CYLINDER ROD ASSY, LVL |
| 3 | 241202 | 1 | GLAND, 2-1/2" BORE X 1-1/2" ROD |
| 4 | 241203 | 1 | DETAIL, 2-1/2" PISTON, LV |
| 5 | 241103 | 1 | NYLOCK NUT, 3/4 - 16 UNF |
| 6 | 818235 | 1 | GREASE FITTING, 1/8" NPT, STRAIGHT |
| 7 | 241016 | 1 | VALVE, LOCKING, CPD-084P, PARKER |
| 8 | 241335 | 2 | 3/8 TUBE COMPRESSION FITTING TO #4 JIC MALE, 90 DEGREE |
| 9 | 108129 | 2 | TUBE NUT, 3/8" |
| 10 | 108130 | 2 | TUBE FERRULE, 3/8" |
| 11 | 241208 | 1 | O-RING; 2-330 |
| 12 | 241209 | 1 | BACK UP RING, 8-330 |
| 13 | 241105 | 1 | POLYPAK ROD SEAL 2500-1500 |
| 14 | 241106 | 1 | ROD WIPER 940-17 |
| 15 | 241107 | 1 | O-RING 2-210 |
| 16 | 241204 | 2 | POLYPAK PISTON SEAL 2500-2000 |

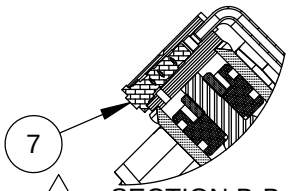
NOTES:
SEE PP008 FOR CYLINDER ASSEMBLY & TEST PROCEDURE
DMF P/N 241225 - SEAL KIT INCLUDES ITEM #'S 11, 12, 13, 14, 15, 16

TORQUE:
300 ft-lbs




SECTION A-A
SCALE 7 : 16




SECTION B-B
SCALE 1 : 6

**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| D | 7/10/13 | 21.81 WAS 21.99 | BJF | |
| C | 4/1/13 | 241519 WAS 241515; REMOVED 241207 | BJF | |
| B | 2/29/12 | 818235 WAS 240123 | JTM | |
| A | 12/1/11 | 241016 WAS 241013 | JTM | |

| TOLERANCES: (UNLESS SPECIFIED) | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

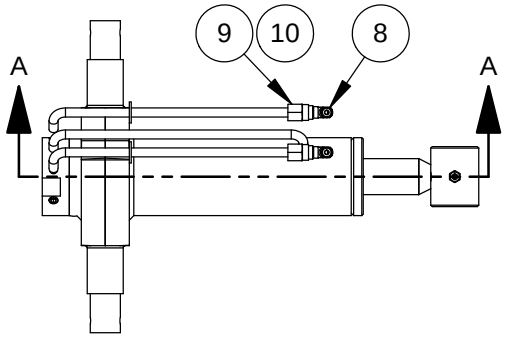
BREAK SHARP EDGES ( 0.030 X 45° MAX )

RW-1019

TITLE:
1019 REAR HYDRAULIC CYLINDER, PASSENGER SIDE, X-SHORT LINKS

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

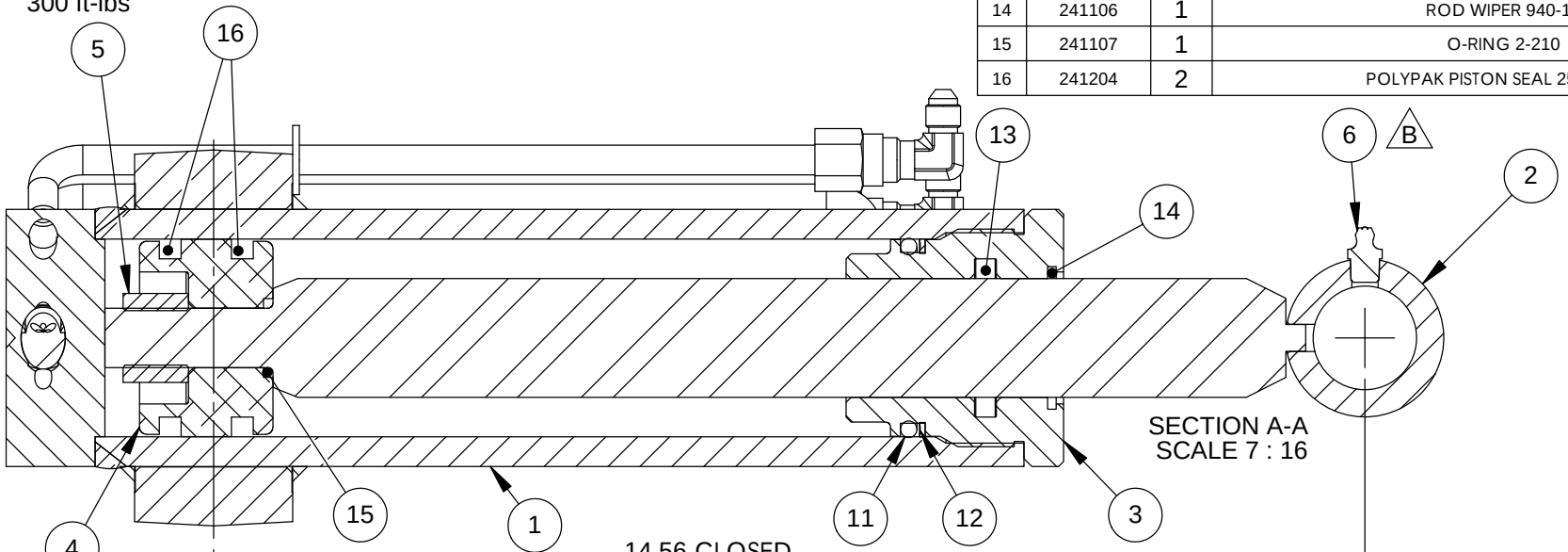
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 7/15/11 | 241506 | D |




SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE
DMF P/N 241225 - SEAL KIT INCLUDES ITEM #'S 11, 12, 13, 14, 15, 16

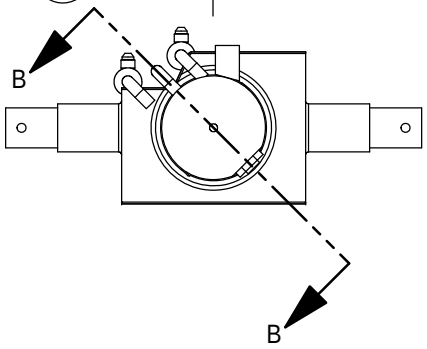
| ITEM NO. | PART NUMBER | QTY. | DESCRIPTION |
|---|---|---|---|
| C 1 | 241520 | 1 | WELDMENT, 2-1/2" TUBE, LVALVE, XTRA SHORT, REAR LH |
| 2 | 241200 | 1 | 2-1/2" 1019 REAR CYLINDER ROD ASSY, LVL |
| 3 | 241202 | 1 | GLAND, 2-1/2" BORE X 1-1/2" ROD |
| 4 | 241203 | 1 | DETAIL, 2-1/2" PISTON, LV |
| 5 | 241103 | 1 | NYLOCK NUT, 3/4 - 16 UNF |
| B 6 | 818235 | 1 | GREASE FITTING, 1/8" NPT, STRAIGHT |
| A 7 | 241016 | 1 | VALVE, LOCKING, CPD-084P, PARKER |
| 8 | 241335 | 2 | 3/8 TUBE COMPRESSION FITTING TO #4 JIC MALE, 90 DEGREE |
| 9 | 108129 | 2 | TUBE NUT, 3/8" |
| 10 | 108130 | 2 | TUBE FERRULE, 3/8" |
| 11 | 241208 | 1 | O-RING; 2-330 |
| 12 | 241209 | 1 | BACK UP RING, 8-330 |
| 13 | 241105 | 1 | POLYPAK ROD SEAL 2500-1500 |
| 14 | 241106 | 1 | ROD WIPER 940-17 |
| 15 | 241107 | 1 | O-RING 2-210 |
| 16 | 241204 | 2 | POLYPAK PISTON SEAL 2500-2000 |

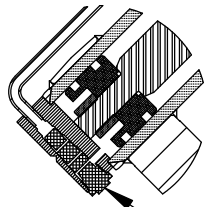
TORQUE:
300 ft-lbs




SECTION A-A
SCALE 7 : 16

14.56 CLOSED
D 21.81 OPEN




SECTION B-B
SCALE 1 : 6

## APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| D | 7/10/13 | 21.81 WAS 21.99 | BJF | |
| C | 4/2/13 | 241520 WAS 241516; REMOVED SPACER 241207 | BJF | |
| B | 2/29/12 | 818235 WAS 240123 | JTM | |
| A | 12/1/11 | 241016 WAS 241013 | JTM | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

DRAWN BY: NEH
APPD BY:

TITLE: 1019 REAR HYDRAULIC CYLINDER, DRIVER SIDE, X-SH LINKS

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 7/16/11
DRAWING NUMBER: 241507
REV: D

## DMF P/N 240125 - SEAL KIT
## (SEAL KIT INCLUDES ITEM #'s 4,5,6,7,8 & 9)

**TO DETERMINE DRIVER SIDE VS. PASSENGER SIDE**

DUE TO WEIGHT OF CYLINDERS, PLACE CYLINDER ON THE FLOOR OR TABLE FIRST. THEN POSITION THE CYLINDER (WITH FITTINGS POINTED TOWARDS YOU) AS IF YOU WERE HOLDING THE BASE END IN YOUR LEFT HAND AND THE ROD END IN YOUR RIGHT HAND. WITH IT POSITIONED AS SUCH, LOOKING AT THE ACTUAL FITTING ON THE BASE END:

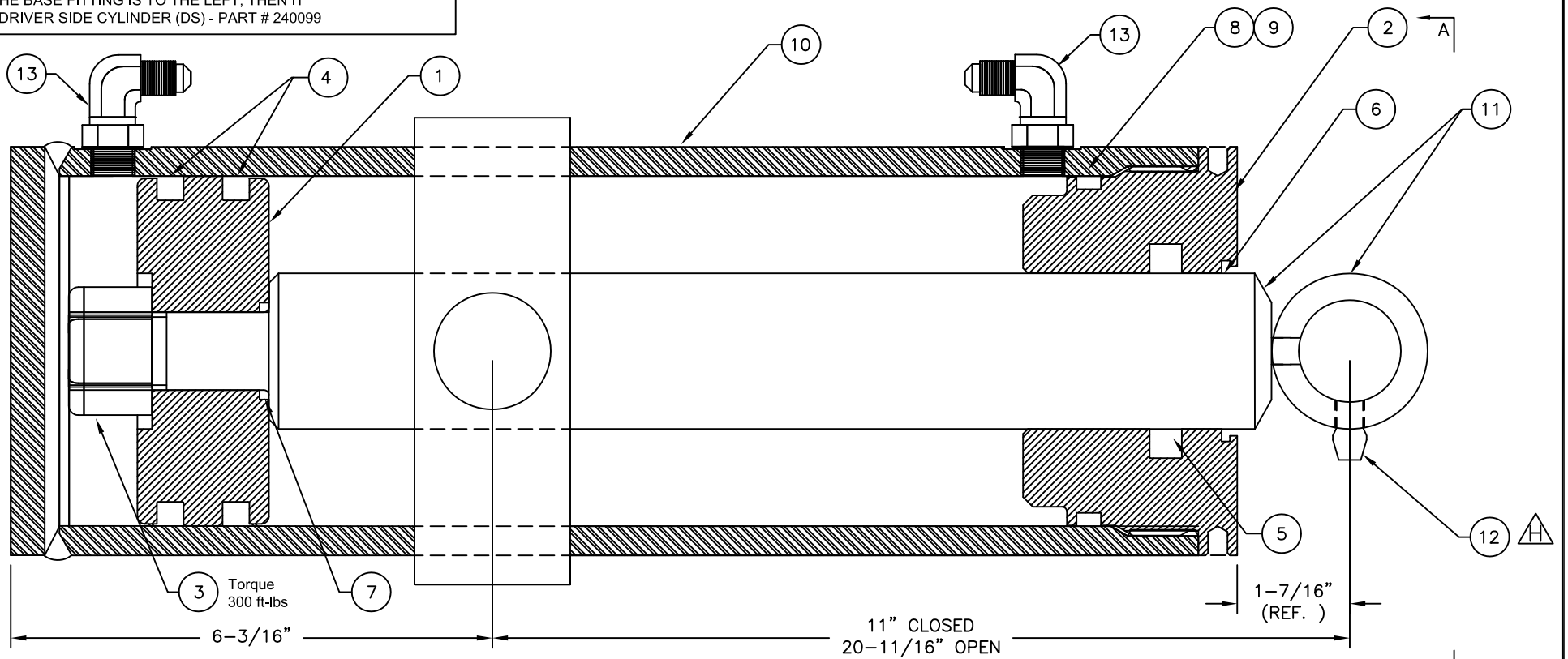
*IF THE BASE FITTING IS TO THE RIGHT, THEN IT IS A PASSENGER SIDE CYLINDER (PS) - PART # 240100

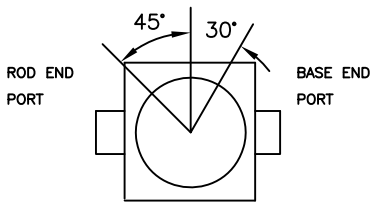
⚠

*IF THE BASE FITTING IS TO THE LEFT, THEN IT IS A DRIVER SIDE CYLINDER (DS) - PART # 240099

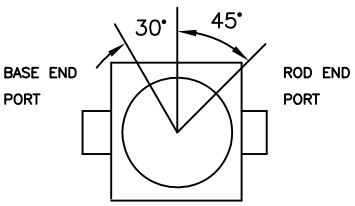
**SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE**

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 240101 | 1 | PISTON: 4–1/2" |
| 2 | 240102 | 1 | GLAND: 4–1/2" |
| 3 | 240103 | 1 | NUT, NYLOCK: 1"–14 |
| 4 | 240104 | 2 | SEAL, PISTON: 3120–3875 |
| 5 | 240105 | 1 | SEAL, ROD: 3750–2000 |
| 6 | 240106 | 1 | WIPER, ROD: 959–21 |
| 7 | 240107 | 1 | O–RING, PISTON: 2–214 |
| 8 | 240108 | 1 | O–RING, GLAND: 2–346 |
| 9 | 240109 | 1 | O–RING, GLAND BACK–UP: 8–346 |
| 10 | 240110 | 1 or | BARREL ASSEMBLY: 4–1/2" (DRIVER'S SIDE) |
|  | 240115 | 1 | BARREL ASSEMBLY: 4–1/2" (PASSENGER'S SIDE) |
| 11 | 240120 | 1 | ROD ASSEMBLY: 2" |
| ⚠H 12 | 818235 | 1 | GREASE FITTING: 1/8" NPT |
| 13 | 241006 | 2 | FITTING, ELBOW: 1/4"JIC x 9/16"–18; 6801–NW–4–6 |




DETAIL A–A
P/N 240100
PASSENGER'S SIDE




DETAIL A–A
P/N 240099
DRIVER'S SIDE

# ⚠6 1630/1420/1212/1019 FRONT CYLINDER

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| ⚠ |  |  |  |  |
| ⚠ | 7/25/13 | SWAPPED PASSENGER/DRIVER SIDE | JDI |  |
| ⚠H | 2/17/12 | 818235 WAS 240123 | JTM |  |

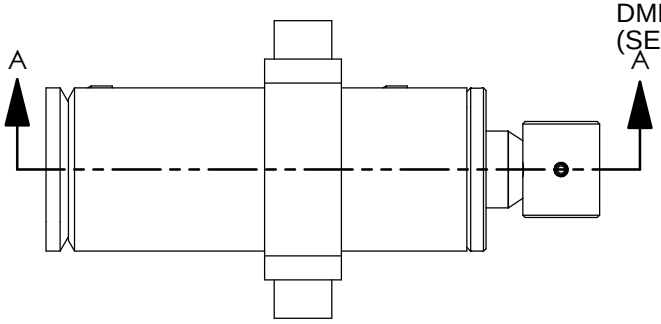
| TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX OR .XXXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |
| BREAK SHARP EDGES ( 0.030 x 45° MAX ) | |

TITLE: RW–1630 FRONT HYDRAULIC CYLINDER ASSEMBLY (4–1/2"BORE x 2"ROD x 9–11/16"STROKE)

DIVERSIFIED METAL FABRICATORS,INC.(404)875–1512

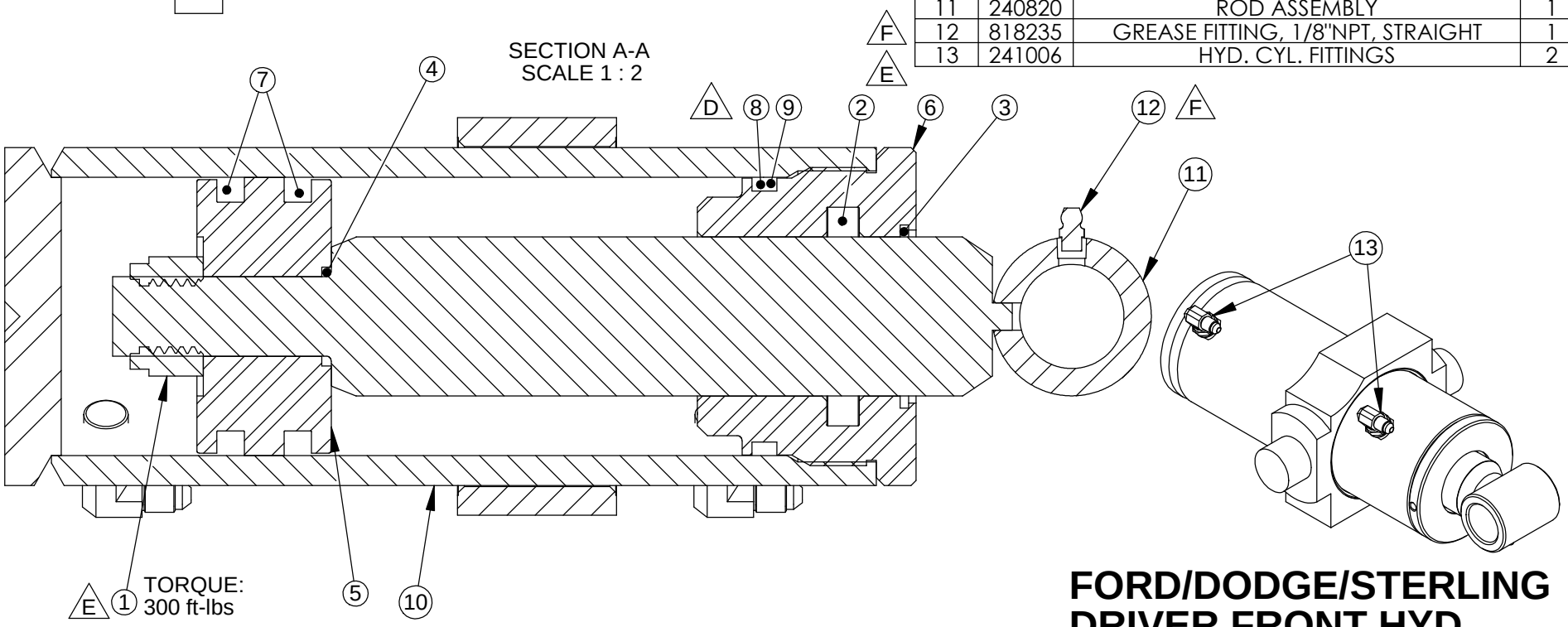
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| TSH |  | 11/10/92 | 240099 DS/ 240100 PS | I |

DMF P/N 240225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 2,3,4,8,9,10




| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 240103 | 1" NUT | 1 |
| 2 | 240105 | ROD SEAL | 1 |
| 3 | 240106 | WIPER 959-21 AN-21 | 1 |
| 4 | 240107 | O'RING 2-214 | 1 |
| 5 | 240201 | PISTON | 1 |
| 6 | 240202 | GLAND | 1 |
| 7 | 240204 | PISTON SEAL 3120-2875 | 2 |
| 8 | 240208 | O'RING 2-338 | 1 |
| 9 | 240209 | B'UP RING 8-338 | 1 |
| 10 | 240810 | TUBE ASSEMBLY | 1 |
| 11 | 240820 | ROD ASSEMBLY | 1 |
| 12 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 13 | 241006 | HYD. CYL. FITTINGS | 2 |

SECTION A-A
SCALE 1 : 2




# FORD/DODGE/STERLING DRIVER FRONT HYD. CYLINDER ASSY.

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| F | 2/17/12 | 818235 WAS 240123 | JTM | |
| E | 7/16/11 | ADDED ITEM 13, ADDED TORQUE SPEC | NEH | |
| D | 5/16/11 | CLARIFIED COMPONENT ORDER | NEH | |
| C | 4/21/11 | ADDED SEAL KIT NOTE | NEH | |
| B | 3/17/11 | COMPLETED DRAWING, CORRECTED ORIENTATION | NEH | |
| A | 11/19/10 | REDRAWN IN SOLIDWORKS | BJF | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: RW-1019 FRONT HYDRAULIC CYLINDER ASSEMBLY, DRIVER'S SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| MSM | | 10/13/94 | 240800 | F |

TITLE: Cylinder Assembly

PURPOSE: To Establish Production Methods For The Assembly Of Cylinders

COMMON USAGE: All Models

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: D.M.F. Manufactured Hydraulic Cylinders With "PolyPack" Piston Seals

ASSEMBLY PROCEDURE:

PISTON:
A) Inspect for sharp edges. Deburr as neccessary.
B) Clean and blow off with shop air.
C) Use Blue Assemblee Goo (19260) to aid in assembly.
D) Install two (2) seals with each lip (o'ring insert side) facing the closer piston face.

GLAND:
A) Inspect OD and bore for sharp edges. Deburr as neccessary.
B) Clean and blow off with shop air.
C) Use Blue Assemblee Goo (19260) to aid in assembly.
D) Install wiper ring in bore with lip facing outboard.
E) Install seal in bore with lip (o'ring insert side) facing inboard.
F) Inspect for seal damage. Any shaved seal material requires replacement.
G) Install backing ring in O'ring groove on OD with concave surface facing inboard.
H) Install O'ring on inboard side of groove in Step G.
I) Inspect O'ring for damage.

ROD ASSEMBLY:
A) Clean and inspect shaft surface for scratches and dings.
B) Install grease fitting in rod end per PP001.
C) Use Blue Assemblee Goo (19260) to aid in assembly.
D) Install gland assembly onto rod with the outboard side facing the rod end.
E) Install rod O'ring onto threaded end of rod.
F) Inspect O'ring for damage.
G) Install piston assembly onto rod with the O'ring counterbore facing O'ring in Step E. Be certain that O'ring seats in counterbore.
H) Install self locking rod nut on rod. Tighten to 200 to 300 foot-pounds torque (Torque will vary based on rod & nut size).

CYLINDER ASSEMBLY:
A) Inspect cylinder ports for minimum three (3) threads and no burrs. Deburr as neccessary.
B) Clean tube ID threads and bore and blow out with shop air.
C) Inspect threads for debris.
D) Support cylinder barrel assembly with gland end facing up.
E) Maintain rod assembly in vertical position, align piston with tube bore, engage piston in tube bore, strike rod end with hammer until piston is below first cylinder port.
F) Slide gland down on rod, engage gland threads into barrel by hand.
G) Screw gland into barrel with spanner wrench until gland face contacts barrel tube-end.
H) Install two (2) hydraulic fittings into cylinder ports per PP003.

PRESSURE TESTING:
A) Connect hydraulic power unit to cylinder.
B) Operate cylinder through complete cycle to purge air and fill with clean hydraulic oil.
C) Operate cylinder to full extension and retraction and maintain at 3300 PSI for 15 seconds at each extent. While maintaining pressure at each extent, visually inspect ports, rod seal, gland OD seal, and cylinder bottom areas for leakage.
D) Disconnect hydraulic power unit and install caps on port fittings.
E) Impression stamp cylinder bottom when all preceding steps have been successfully accomplished.

COMMENTS: Specific assembly instructions on prints are performed with preference over this procedure.

**FOR CYLINDERS GREATER THAN Ø4.5", DO NOT ALLOW CYLINDER TO BOTTOM DURING TESTING. BLOCK ROD AGAINST GLAND WITH PIN AND 1" BLOCKS.**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 5/25/12 | USE 19260 INSTEAD OF HYDRAULIC OIL | JDI | |
| B | 7/16/11 | REMOVED CYLINDER PART #'S | NEH | |
| A | 9/27/07 | ADDED CYLINDER TESTING WARNING | WAK | |

| TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS | |
|---|---|
| FRAC, MACH: | ± 1/32 |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX OR .XXXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |
| BREAK SHARP EDGES ( 0.030 X 45° MAX ) | |

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| WAK | | 6/24/94 | PP008 | C |

TITLE: PRODUCTION PROCEDURE 008 CYLINDER ASSEMBLY

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

TITLE: SAE (JIC) 37 Degree Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of SAE (JIC) Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With SAE (JIC) 37 Degree Flared Ends.

PROCEDURE: A) Inspect fitting components to ensure that mating parts are free of burrs, nicks, scratches or any foreign material.

B) Align tube flare against nose of fitting body and screw on the nut, finger tight, clamping the tube flare between the fitting nose and the nut.

C) Tighten the nut the indicated Flats From Finger Tight (F.F.F.T.) listed in the chart below. Use a second wrench to hold the hose in proper alignment while tightening to avoid twisting the lay line. One flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat ( 1/24th of full turn).

## SAE (JIC) 37° Flare Fittings

| Size | Thread Size | Tube Connection F.F.F.T. | Swivel Nut or Hose Connection F.F.F.T. |
|---|---|---|---|
| -4 | 7/16-20 | 2 | 2 |
| -6 | 9/16-18 | 1.5 | 1.25 |
| -8 | 3/4-16 | 1.5 | 1 |
| -12 | 1 1/16-12 | 1.25 | 1 |
| -16 | 1 5/16-12 | 1 | 1 |
| -20 | 1 5/8-12 | 1 | 1 |
| -24 | 1 7/8-12 | 1 | 1 |

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

DRAWN BY: TSH
APPD BY:

TITLE: PRODUCTION PROCEEDURE 005
JIC FITTING INSTALLATION

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

DATE: 06/02/94

DRAWING NUMBER: PP005

REV: #

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

TITLE: SAE O-Ring Fitting Installation

PURPOSE: To Establish Production Methods For The Installation Of O-Ring Medium And High Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 4000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With O-Ring Seals And SAE Straight Threads.

PROCEDURE:

A) Inspect to ensure that both mating parts are free of burrs, nicks, scratches or any foreign particles.

B) Lubricate O-Ring with light coat of system fluid or compatible oil.

C) For adjustable fittings, back off lock nut as far as possible. Make sure back up washer is not loose and is pushed up to nut.

D) Screw fitting into port until finger tight. Back up washer (adjustable) or hex face (non-adj.) should contact port face. Light wrenching may be necessary.

E) To align an adjustable fitting, unscrew by desired amount but not more than one full turn. Use wrench to hold in position. Screw nut down to port face until finger tight.

F) Tighten lock nut (adjustable) or fitting (non-adj.) the indicated Flats From Finger Tight (F.F.F.T.) in either the Adjustable chart or the Non-Adjustable chart below. One Flat on a hex is equal to 1/6th of a full turn. Tolerance on tightening is plus or minus 1/4 flat (1/24th of full turn).

G) Inspect to ensure that O-Ring is not pinched and back up washer/hex seats flat on face of port.

## ADJUSTABLE FITTINGS

| Fitting Size | SAE Port Thread Size | F.F.F.T. |
|---|---|---|
| 2 | 5/16–24 | 1.0 |
| 4 | 7/16–20 | 1.5 |
| 6 | 9/16–18 | 1.5 |
| 8 | 3/4–16 | 1.5 |
| 10 | 7/8–14 | 1.5 |
| 12 | 1 1/16–12 | 1.5 |
| 14 | 1 3/16–12 | 1.5 |
| 16 | 1 5/16–12 | 1.5 |
| 20 | 1 5/8–12 | 2.0 |
| 24 | 1 7/8–12 | 2.0 |

## NON–ADJUSTABLE FITTINGS

| Fitting Size | SAE Port Thread Size | F.F.F.T. |
|---|---|---|
| 2 | 5/16–24 | 1.0 |
| 4 | 7/16–20 | 1.0 |
| 6 | 9/16–18 | 1.5 |
| 8 | 3/4–16 | 1.5 |
| 10 | 7/8–14 | 1.5 |
| 12 | 1 1/16–12 | 1.5 |
| 14 | 1 3/16–12 | 1.5 |
| 16 | 1 5/16–12 | 1.5 |
| 20 | 1 5/8–12 | 1.5 |
| 24 | 1 7/8–12 | 1.5 |

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

DRAWN BY: TSH
APPD BY:

TITLE: PRODUCTION PROCEDURE 003 O–RING FITTING INSTALLATION

DIVERSIFIED METAL FABRICATORS, INC. (404) 875–1512

DATE: 06/02/94

DRAWING NUMBER: PP003

REV: #

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | | | |
| 2 | | | |

TITLE: National Pipe Thread (NPT) Fitting Installation.

PURPOSE: To Establish Production Methods For The Installation Of NPT Medium Pressure Hydraulic Fittings.

COMMON USAGE: Hydraulic Systems Operating With Petroleum-Based Fluids At Pressures Below 3000 PSI Or Minimum Component Rating.

PARTS GENERALLY ENCOMPASSED BY THIS PROCEDURE: Purchased Fittings With Tapered Pipe Threads.

PROCEDURE: A) Inspect port components to ensure that male and female threads are free of nicks, burrs, dirt etc.

B) Apply sealant/lubricant to male pipe threads. Use only Permatex #14D "Thread Sealant With Teflon" paste (or Engineering approved equal). The first few threads must be left uncovered to avoid system contamination.

C) Screw fitting into female pipe port to the finger tight position.

D) Wrench tighten the fitting to the appropriate Turns From Finger Tight (T.F.F.T.) shown in chart below. Make sure that tube end of shaped fitting is aligned to receive in coming tube or hose assembly.

## STEEL PIPE THREAD FITTINGS

| Fitting Size | Pipe Thread Size, NPT | T.F.F.T. |
|---|---|---|
| 2 | 1/8-27 | 2.0-2.5 |
| 4 | 1/8-27 | 2.0-2.5 |
| 6 | 1/4-18 | 1.5-2.0 |
| 8 | 3/8-18 | 2.0-2.5 |
| 10 | 1/2-14 | 2.0-2.5 |
| 12 | 3/4-14 | 1.5-2.0 |
| 14 | 3/4-14 | 1.5-2.0 |
| 16 | 1-11 1/2 | 1.5-2.0 |
| 20 | 1 1/4-11 1/2 | 1.5-2.0 |
| 24 | 1 1/2-11 1/2 | 1.5-2.0 |

COMMENTS: Teflon Tape May Be Used In Certain Situations With Engineering Approval. A Pipe Fitting Is Limited To One Or Two Re-Uses.

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC. MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

TITLE: PRODUCTION PROCEDURE 004
PIPE FITTING INSTALLATION

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| TSH | | 06/02/94 | PP004 | # |

### 5.4.1 Before Ordering Parts – Rear Railgear

Required Information for Ordering Parts:

- You must have the Railgear serial number when ordering parts. This uniquely identifies your Railgear, as it was built to your specifications, and also allows DMF to help you maintain a history of your Railgear. If you are placing a parts order through a maintenance facility, please inform them of the serial number, so that they can relay the information when placing your order.

- Returns: DMF has a Return Authorization Procedure. You must contact DMF for an RA# before returning any parts for any reason. Parts will not be credited without an RA#.

- Labor: In extremely rare situations, on a discretionary basis, and with prior approval, DMF will reimburse certain, specific labor costs. If you feel this may apply in your situation, you must contact DMF's Service Department for a Service Authorization Number (SA#). No labor will be reimbursed without an SA#. The SA# must be included on your request for reimbursement.

- Please use driver's side / passenger's side terminology (instead of left/right side) when describing issues with your Railgear. This ensures that everyone involved is clear about where the issue is occurring.

Other Considerations for Ordering Parts:

This is a list of considerations to make before placing a parts order with DMF. There are many variations and customer requirements that we strive to accommodate, and as a result, the more information you can provide to us when placing an order, the more likely that we will be able to help you quickly and efficiently.

Wheels:

- If you are a customer using special wheel profiles (this is especially prevalent in Metros), please be sure to inform the DMF Parts Department that there may be a special wheel profile involved in your order.

- DMF offers both insulated and non-insulated wheels – Please confirm which wheel you need before ordering. Insulated wheels can be identified by a grooved ring machined around the inside of the rail wheel. This grooved ring can been seen and felt, and is located about an inch in from the outside tread.

Links:

- DMF's links come in 3 sizes: x-short, short, and long. The sizes cannot be mixed between upper and lower links (i.e. Long upper link can only be used with long lower link. Each link has a slotted version as well.

- Links are sold individually, unless you require an entire set of 8 (4 front, 4 rear). See drawings for additional clarification on link type (i.e. long, short, or extra-short), and the appropriate part numbers for ordering.

- Note: Short links are DMF's default configuration for our Railgear.

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Cylinders / Brakes :

- Note that there are two sizes of rear cylinders: Standard and Extra Long. The only difference between these two cylinders is their barrel length, so please confirm the length of your cylinder and select the appropriate drawing for part numbers.

Rear Mounting Bracket:

- DMF's 1019 series of Railgear comes with a standard rear mounting bracket. This bracket works on all currently approved chassis.

- For special applications, other bracket widths or heights are available. Please contact the DMF parts department for more information.

- For the Ford F-4/550 series chassis, a special transit bracket is available to meet specific criteria regarding curve performance. Refer to drawing 5.4.15.

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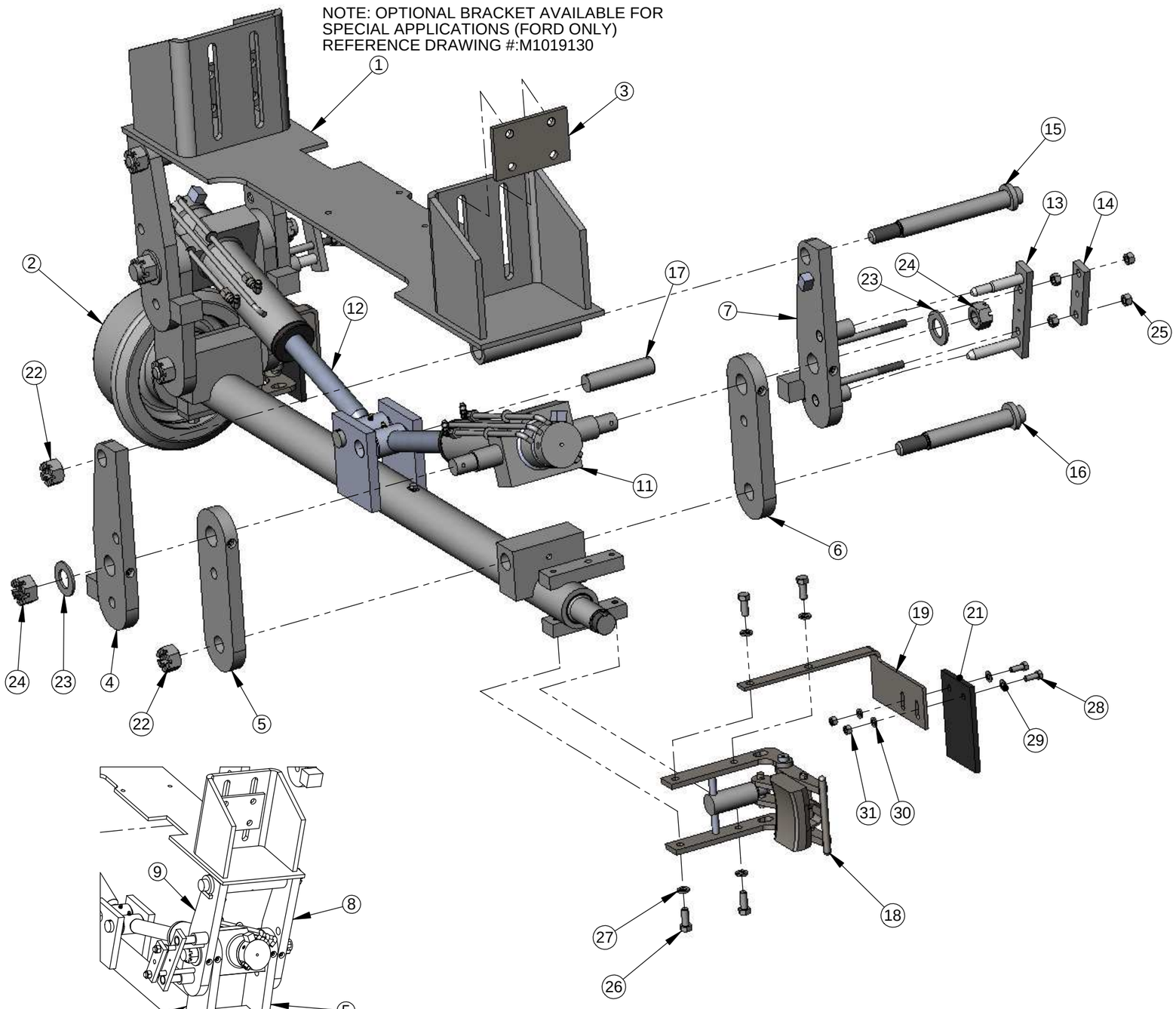
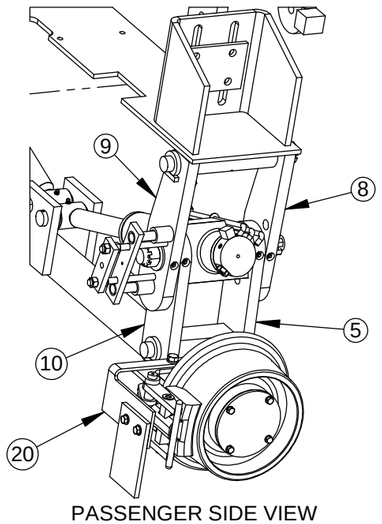
NOTE: OPTIONAL BRACKET AVAILABLE FOR SPECIAL APPLICATIONS (FORD ONLY) REFERENCE DRAWING #:M1019130




PASSENGER SIDE VIEW

| LABEL | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 10083 | RW1019 REAR BRACKET ASSY.,34-1/4"w/BIG GUSSET | 1 |
| 2 | 10676 | RW-1019HD WHEEL & AXLE ASSY.,REAR INSULATED EXT. BRAKES | 1 |
| 3 | 10047 | RW1019/12/1420 REAR BRACKET 4 HOLE PLATE | 2 |
| 4 | 10764 | REAR LINK, SHORT, UPPER FRONT DRIVER SIDE | 1 |
| 5 | 10233 | REAR LINK, SHORT, LOWER FRONT EITHER SIDE | 2 |
| 6 | 10782 | REAR LINK, SHORT, LOWER DRIVER SIDE | 1 |
| 7 | 10774 | REAR LINK, SHORT, UPPER REAR DRIVER REMOTES P/O'S | 1 |
| 8 | 10765 | REAR LINK, SHORT, UPPER FRONT PASSENGER | 1 |
| 9 | 10775 | REAR LINK, SHORT, UPPER REAR PASSENGER REMOTE P/O'S | 1 |
| 10 | 10783 | REAR LINK, SHORT, LOWER PASSENGER SIDE | 1 |
| 11 | 241504 | ASSY, CYL, RR, L'VLV, LH (2-1/2x 9-5/8) | 1 |
| 12 | 241503 | ASSY, CYL, RR, L'VLV, RH (2-1/2x 9-5/8) | 1 |
| 13 | 818582 | REM.DBL.P/O ASSY.(CABLE)(5-3/8")(1019,1212,1420) | 2 |
| 14 | 818563 | REMP/O SLIDE PLATE DETAIL (CABLE)(1/2" THICK) | 2 |
| 15 | 10250 | RW-1019 PIN ASSY., REAR UPPER MOUNTING | 2 |
| 16 | 10251 | RW-1019 PIN ASSY., REAR LOWER MOUNTING | 2 |
| 17 | 10240 | 1019 REAR CYL. ROD PIN | 2 |
| 18 | 12700 | RW-1019 FRONT HYDRAULIC BRAKE ASSY., (1.063 BORE) | 2 |
| 19 | 818626 | RAILSWEEP REAR WELDMENT,LH (BOLT-ON),w/HYD. BRAKES | 1 |
| 20 | 818627 | RAILSWEEP REAR WELDMENT,RH (BOLT-ON),w/HYD. BRAKES | 1 |
| 21 | 818503 | RAILSWEEP RUBBER BELTING DETAIL | 2 |
| 22 | 818127 | RW-1630 FRONT HEX NUT, SLOTTED (SLHN;1"-8) | 4 |
| 23 | 818289 | RW-1630 REAR CYL. TURNNION FLAT WASHER (FW1-1/4") | 4 |
| 24 | 818256 | RW-1630 REAR SLOTTED NUT (1-1/4"-7) | 4 |
| 25 | 818116 | HEX NUT 1/2-13 | 8 |
| 26 | 12479 | RW-1019/1212 BOLT (HHCS 1/2"-13 X 1-1/4"GR8) | 8 |
| 27 | 12481 | RW-1019/1212 WASHER, LOCK (1/2" GR8) | 8 |
| 28 | 12475 | RW-1019/1212 BOLT (HHCS 3/8"-16 X 1") | 4 |
| 29 | 818508 | 3/8" FLAT WASHER | 4 |
| 30 | 818520 | LW3/8 RAIL SWEEP | 4 |
| 31 | 810410 | 3/8 HEX NUT FOR VALVE MOUNTS | 4 |
| NS | 818258 | RW-1630 REAR COTTER PIN (1/4"X2-1/2") | 4 |
| NS | 818248 | RW-1630 REAR COTTER PIN (3/16"X2") | 8 |

*MUST HAVE SERIAL # WHEN ORDERING PARTS*

DEPENDING ON OPTIONS, PART #'S MAY VARY; SEE LINK VARIATIONS IN SECTION 5.4

**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

NOTE: DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY, YOUR PARTS MAY NOT BE EXACTLY AS PICTURED

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | - | |
| A | - | - | | |

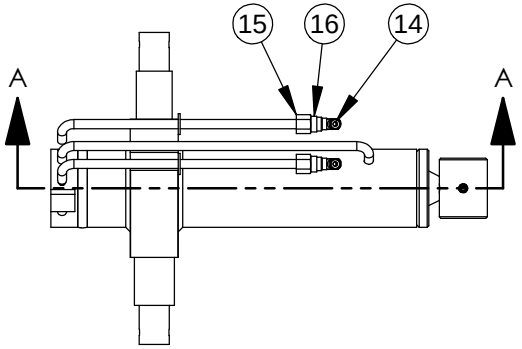
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B

-

TITLE: MANUAL, '08 F-550 REAR ASSY PARTS DIAGRAM, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/19/11 | M1019104 | # |

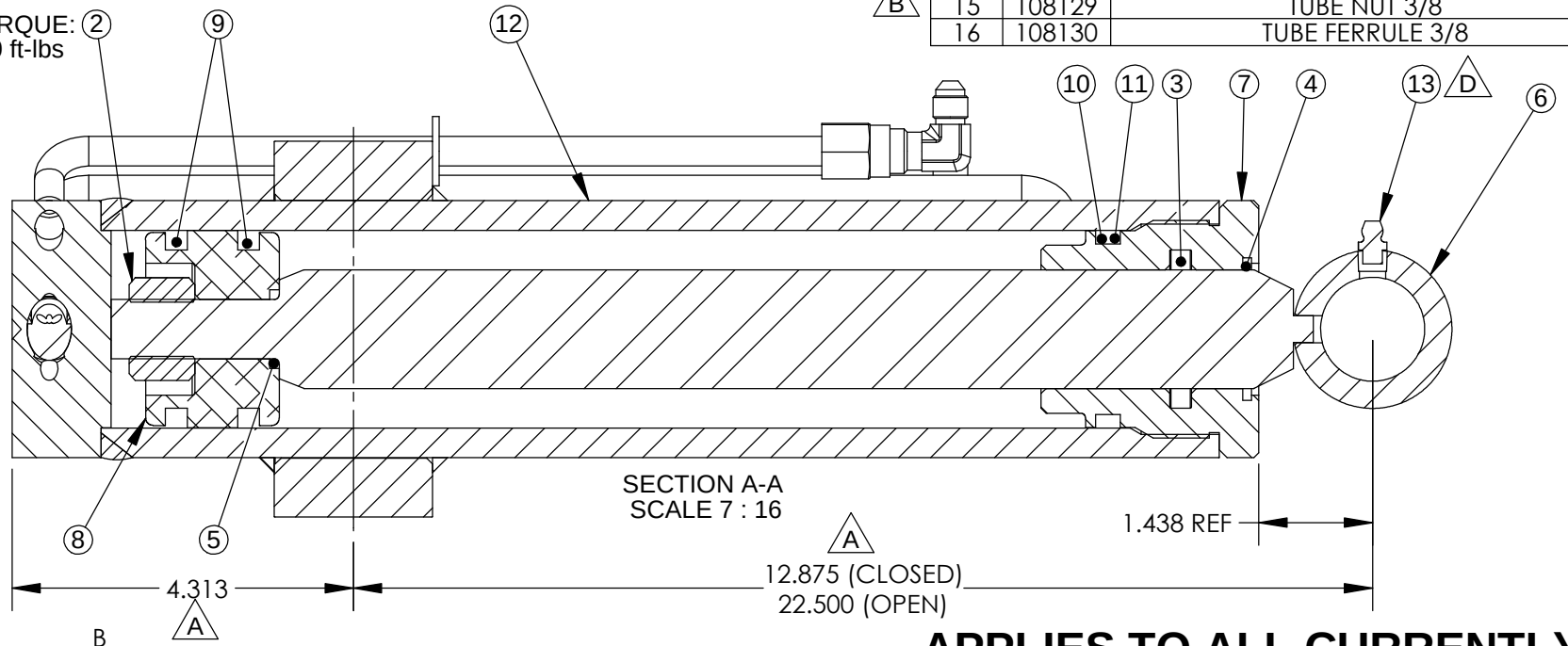



DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

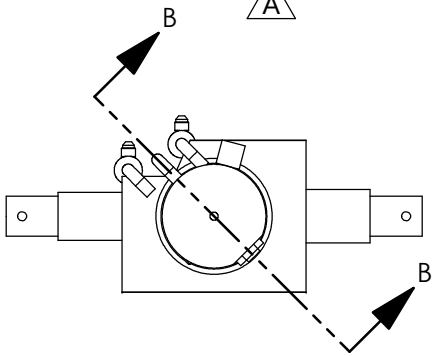
| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 241016 | PARKER LOCKING VALVE | 1 |
| 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| 3 | 241105 | ROD SEAL | 1 |
| 4 | 241106 | ROD WIPER | 1 |
| 5 | 241107 | 3/4" ORING | 1 |
| 6 | 241200 | ROD ASSEMBLY | 1 |
| 7 | 241202 | GLAND | 1 |
| 8 | 241203 | PISTON | 1 |
| 9 | 241204 | PISTON SEAL | 2 |
| 10 | 241208 | 2-1/2" ORING | 1 |
| 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| 12 | 241516 | TUBE WELDMENT | 1 |
| 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| 15 | 108129 | TUBE NUT 3/8 | 2 |
| 16 | 108130 | TUBE FERRULE 3/8 | 2 |

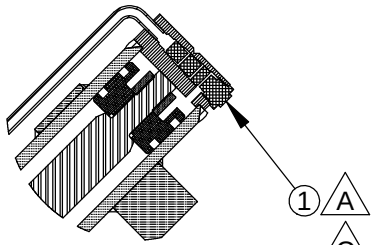
SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE

B TORQUE: 300 ft-lbs




SECTION A-A
SCALE 7 : 16




SECTION B-B
SCALE 1 : 6

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| D | 2/29/12 | 818235 WAS 240123 | JTM | |
| C | 12/1/11 | 241016 WAS 241013 | JTM | |
| B | 7/16/11 | ADDED ITEMS 14-16, ADDED TORQUE SPEC | NEH | |
| A | 5/2/11 | ADDED DIMENSIONS AND BALLOON FOR ITEM #1 | NEH | |

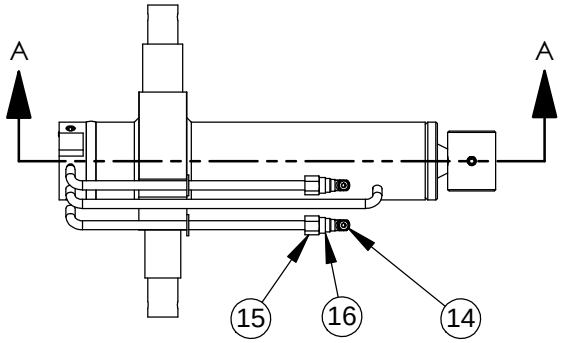
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, DRIVER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

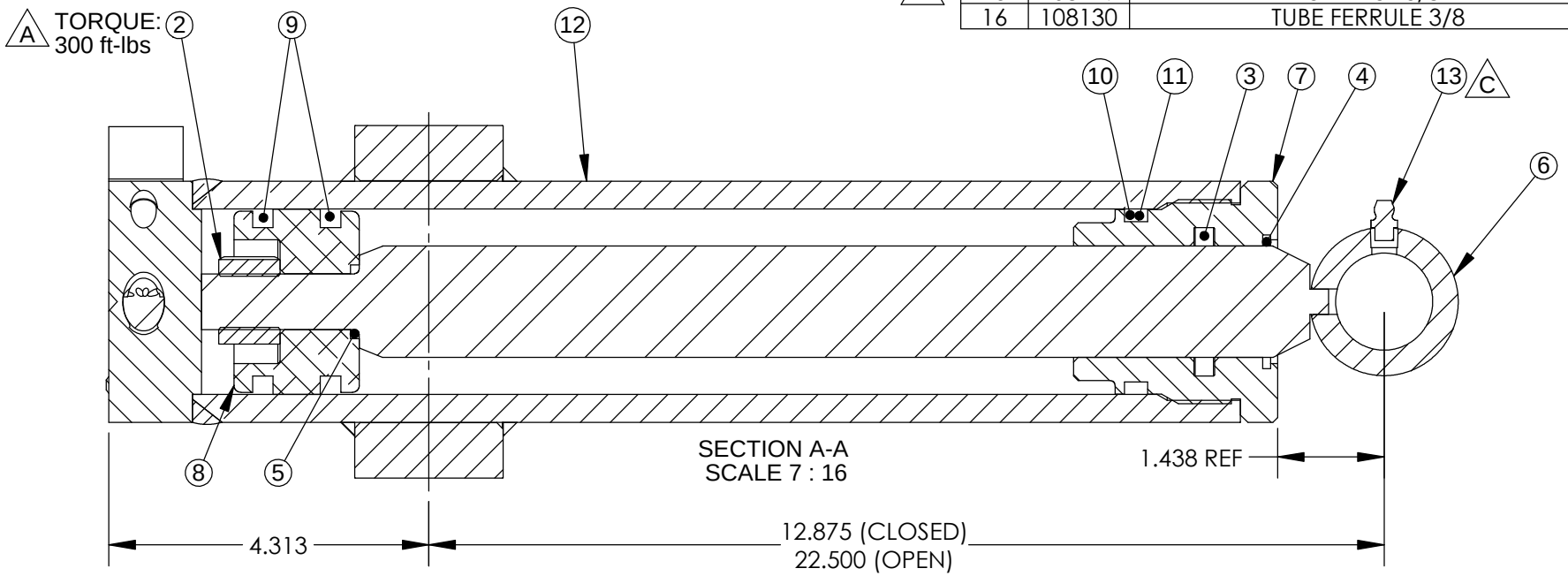
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/20/11 | 241504 | D |

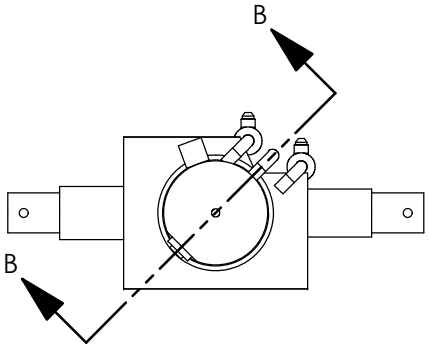


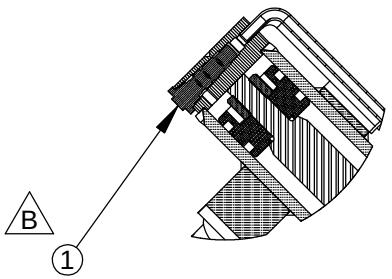

DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 241016 | PARKER LOCKING VALVE | 1 |
| 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| 3 | 241105 | ROD SEAL | 1 |
| 4 | 241106 | ROD WIPER | 1 |
| 5 | 241107 | 3/4" ORING | 1 |
| 6 | 241200 | ROD ASSEMBLY | 1 |
| 7 | 241202 | GLAND | 1 |
| 8 | 241203 | PISTON | 1 |
| 9 | 241204 | PISTON SEAL | 2 |
| 10 | 241208 | 2-1/2" ORING | 1 |
| 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| 12 | 241515 | TUBE WELDMENT | 1 |
| 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| 15 | 108129 | TUBE NUT 3/8 | 2 |
| 16 | 108130 | TUBE FERRULE 3/8 | 2 |

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE




SECTION B-B
SCALE 1 : 6

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 2/17/12 | 818235 WAS 240123 | JTM | |
| B | 12/1/11 | 241016 WAS 241013 | JTM | |
| A | 7/16/11 | ADDED ITEMS 14-16 TO BOM, ADDED TORQUE SPEC | NEH | |

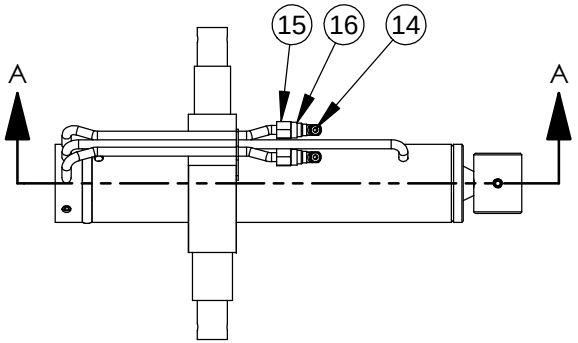
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, PASSENGER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/20/11 | 241503 | C |

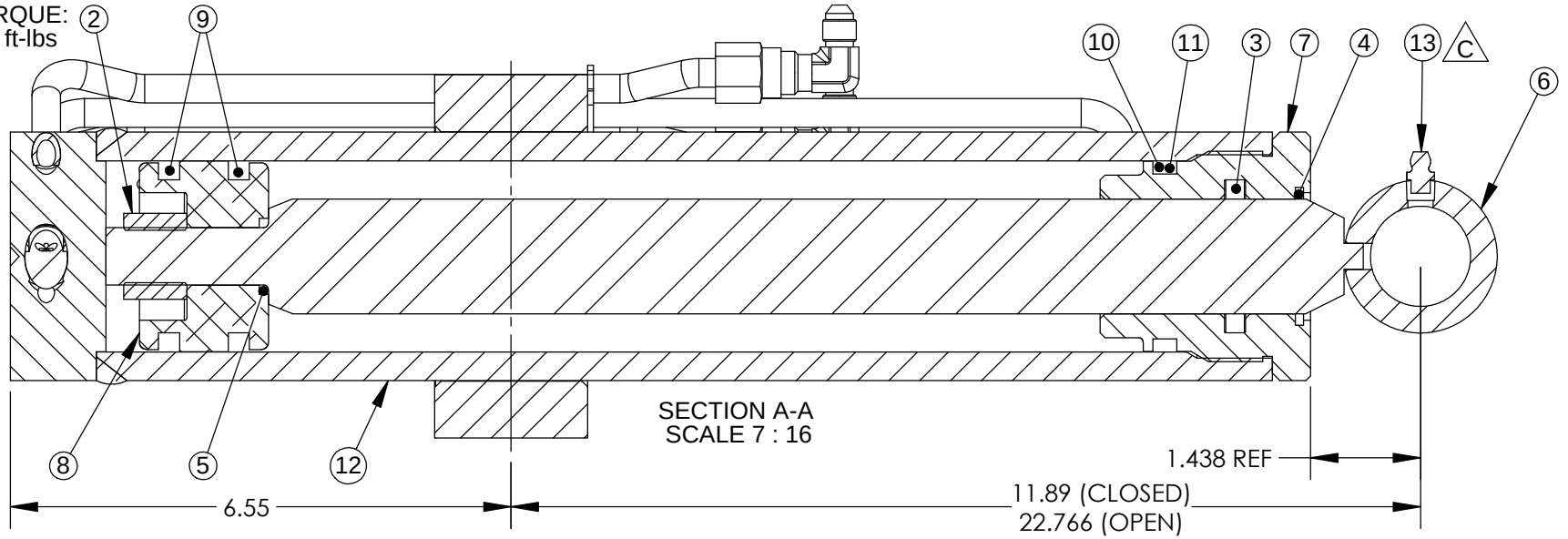


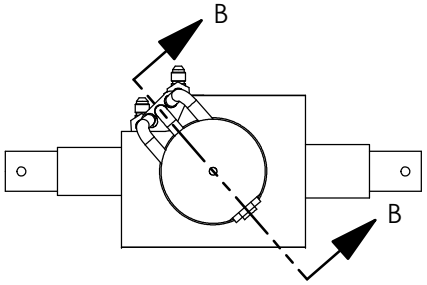

DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

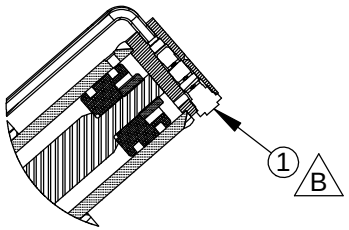
| | ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|---|
| B | 1 | 241016 | PARKER LOCKING VALVE | 1 |
| | 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| | 3 | 241105 | ROD SEAL | 1 |
| | 4 | 241106 | ROD WIPER | 1 |
| | 5 | 241107 | 3/4" ORING | 1 |
| | 6 | 241216 | ROD ASSEMBLY | 1 |
| | 7 | 241202 | GLAND | 1 |
| | 8 | 241203 | PISTON | 1 |
| | 9 | 241204 | PISTON SEAL | 2 |
| | 10 | 241208 | 2-1/2" ORING | 1 |
| | 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| | 12 | 241416 | TUBE WELDMENT | 1 |
| C | 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| | 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| A | 15 | 108129 | TUBE NUT 3/8 | 2 |
| | 16 | 108130 | TUBE FERRULE 3/8 | 2 |

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE

A TORQUE: 300 ft-lbs




SECTION B-B
SCALE 1 : 6

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 2/20/12 | 818235 WAS 240123 | JTM | |
| B | 12/1/11 | 241016 WAS 241013 | JTM | |
| A | 7/16/11 | ADDED ITEMS 14-16, ADDED TORQUE SPEC | NEH | |

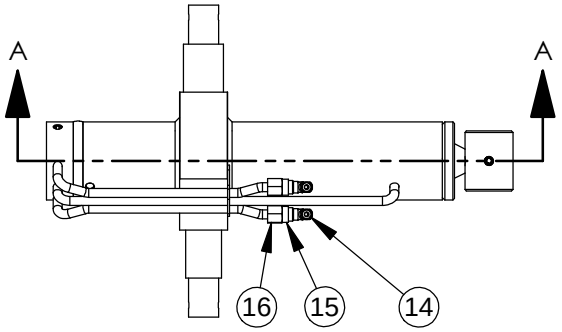
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, LONG LINKS, DRIVER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

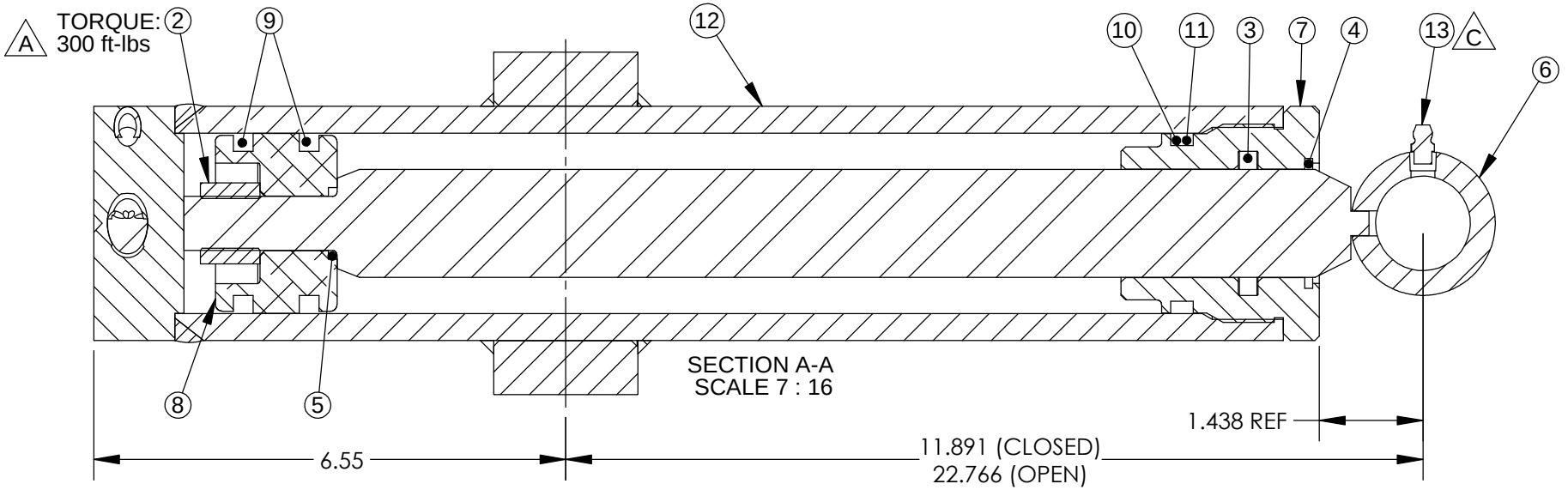
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/21/11 | 241404 | C |

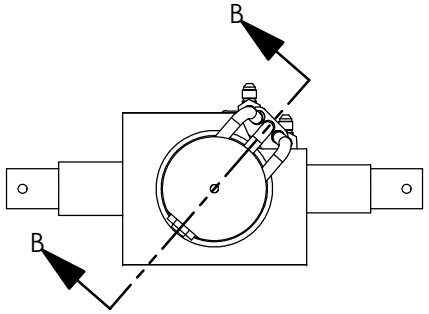


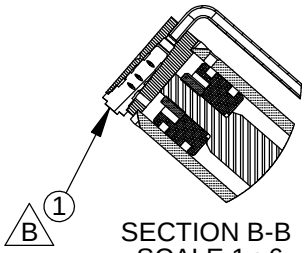

DMF P/N 241225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 3,4,5,9,10,11

| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 241016 | PARKER LOCKING VALVE | 1 |
| 2 | 241103 | 3/4-16 LOCKNUT | 1 |
| 3 | 241105 | ROD SEAL | 1 |
| 4 | 241106 | ROD WIPER | 1 |
| 5 | 241107 | 3/4" ORING | 1 |
| 6 | 241216 | ROD ASSEMBLY | 1 |
| 7 | 241202 | GLAND | 1 |
| 8 | 241203 | PISTON | 1 |
| 9 | 241204 | PISTON SEAL | 2 |
| 10 | 241208 | 2-1/2" ORING | 1 |
| 11 | 241209 | 2-1/2" BACKUP RING | 1 |
| 12 | 241415 | TUBE WELDMENT | 1 |
| 13 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 14 | 241335 | REAR LVLV CYL. COMP. FITTING 90deg | 2 |
| 15 | 108129 | TUBE NUT 3/8 | 2 |
| 16 | 108130 | TUBE FERRULE 3/8 | 2 |

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE




# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| C | 2/20/12 | 818235 WAS 240123 | JTM | |
| B | 12/1/11 | 241016 WAS 241013 | JTM | |
| A | 7/16/11 | ADDED ITEMS 14-16, ADDED TORQUE SPEC | NEH | |

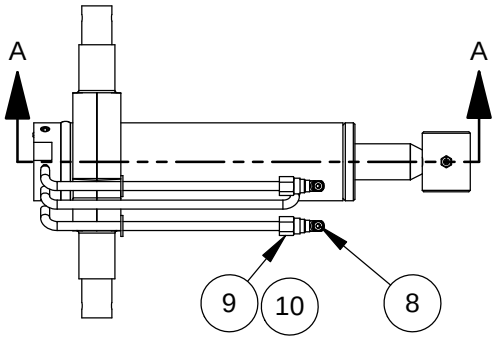
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: 1019 REAR HYDRAULIC CYLINDER, LONG LINKS, PASSENGER SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

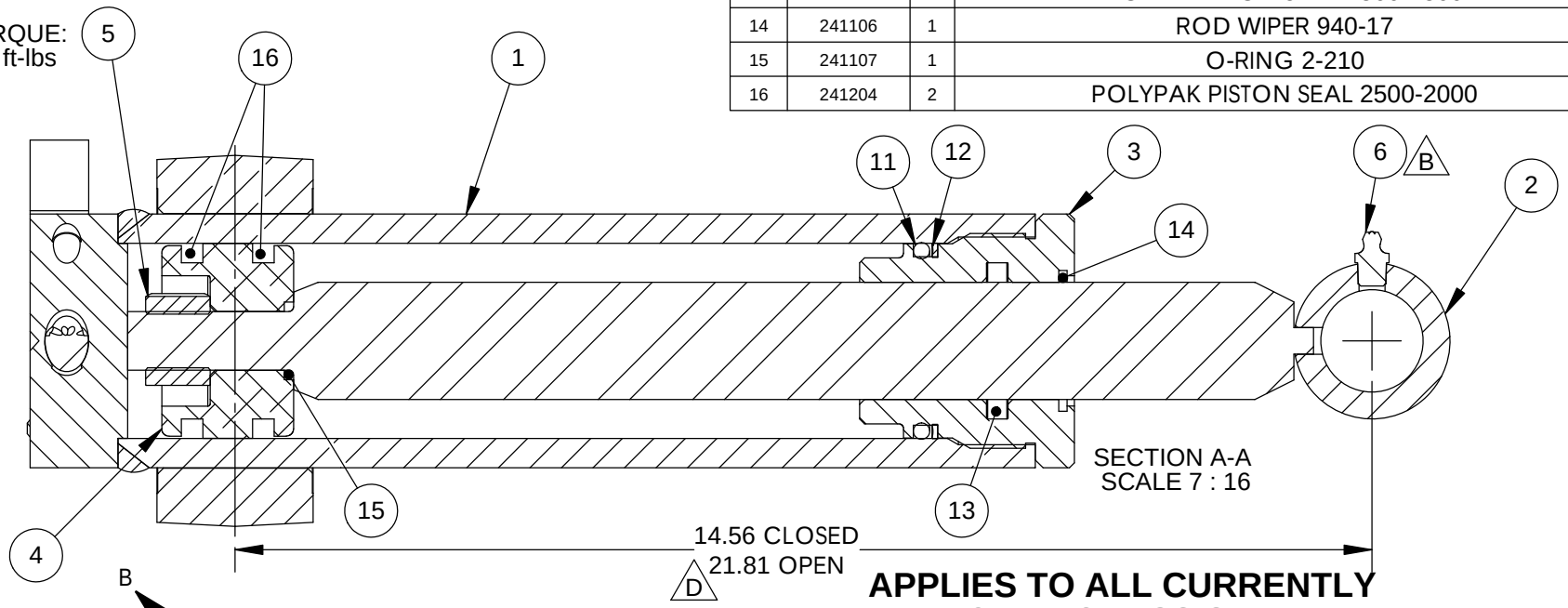
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/20/11 | 241403 | C |



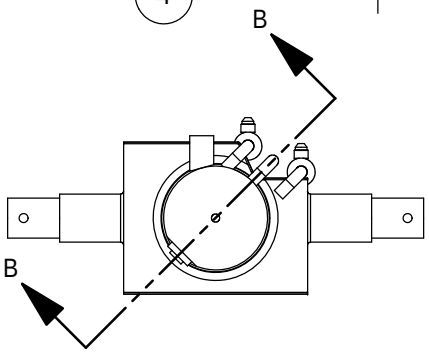

| ITEM NO. | PART NUMBER | QTY. | DESCRIPTION |
|---|---|---|---|
| 1 | 241519 | 1 | WELDMENT, 2-1/2" TUBE, LVALVE, XTRA SHORT, REAR RH |
| 2 | 241200 | 1 | 2-1/2" 1019 REAR CYLINDER ROD ASSY, LVL |
| 3 | 241202 | 1 | GLAND, 2-1/2" BORE X 1-1/2" ROD |
| 4 | 241203 | 1 | DETAIL, 2-1/2" PISTON, LV |
| 5 | 241103 | 1 | NYLOCK NUT, 3/4 - 16 UNF |
| 6 | 818235 | 1 | GREASE FITTING, 1/8" NPT, STRAIGHT |
| 7 | 241016 | 1 | VALVE, LOCKING, CPD-084P, PARKER |
| 8 | 241335 | 2 | 3/8 TUBE COMPRESSION FITTING TO #4 JIC MALE, 90 DEGREE |
| 9 | 108129 | 2 | TUBE NUT, 3/8" |
| 10 | 108130 | 2 | TUBE FERRULE, 3/8" |
| 11 | 241208 | 1 | O-RING; 2-330 |
| 12 | 241209 | 1 | BACK UP RING, 8-330 |
| 13 | 241105 | 1 | POLYPAK ROD SEAL 2500-1500 |
| 14 | 241106 | 1 | ROD WIPER 940-17 |
| 15 | 241107 | 1 | O-RING 2-210 |
| 16 | 241204 | 2 | POLYPAK PISTON SEAL 2500-2000 |

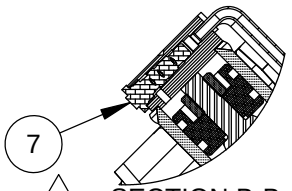
NOTES:
SEE PP008 FOR CYLINDER ASSEMBLY & TEST PROCEDURE
DMF P/N 241225 - SEAL KIT INCLUDES ITEM #'S 11, 12, 13, 14, 15, 16

TORQUE:
300 ft-lbs




SECTION A-A
SCALE 7 : 16




SECTION B-B
SCALE 1 : 6

**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| D | 7/10/13 | 21.81 WAS 21.99 | BJF | |
| C | 4/1/13 | 241519 WAS 241515; REMOVED 241207 | BJF | |
| B | 2/29/12 | 818235 WAS 240123 | JTM | |
| A | 12/1/11 | 241016 WAS 241013 | JTM | |

| TOLERANCES: (UNLESS SPECIFIED) | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

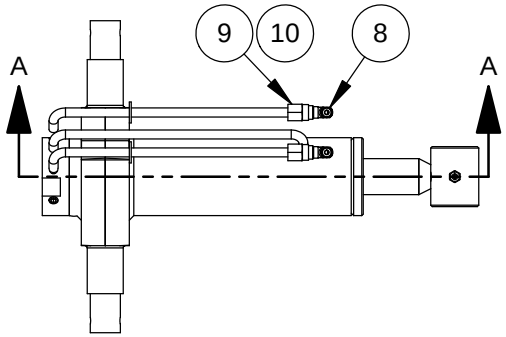
BREAK SHARP EDGES ( 0.030 X 45° MAX )

RW-1019

TITLE:
1019 REAR HYDRAULIC CYLINDER, PASSENGER SIDE, X-SHORT LINKS

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

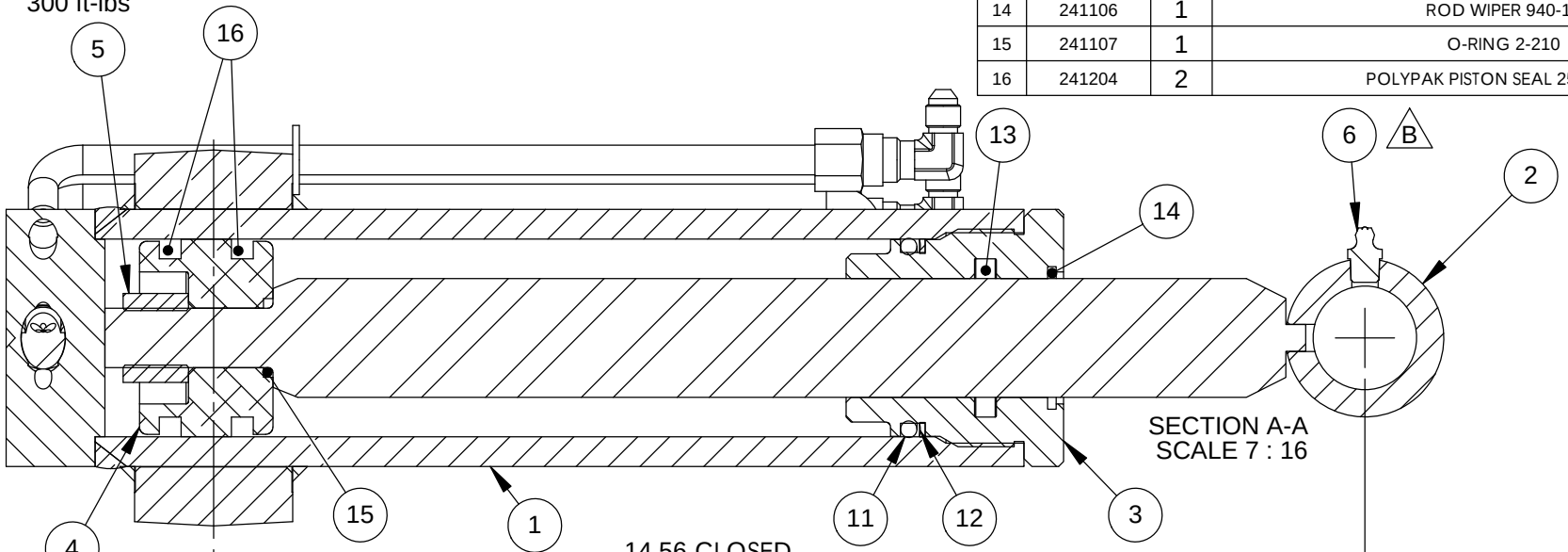
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 7/15/11 | 241506 | D |




SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE
DMF P/N 241225 - SEAL KIT INCLUDES ITEM #'S 11, 12, 13, 14, 15, 16

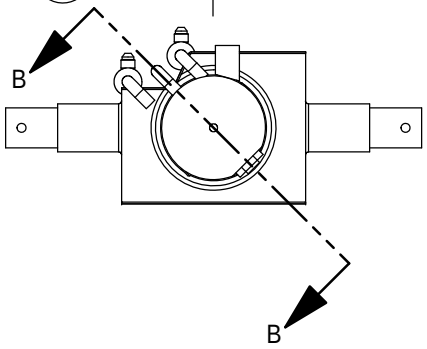
| ITEM NO. | PART NUMBER | QTY. | DESCRIPTION |
|---|---|---|---|
| C 1 | 241520 | 1 | WELDMENT, 2-1/2" TUBE, LVALVE, XTRA SHORT, REAR LH |
| 2 | 241200 | 1 | 2-1/2" 1019 REAR CYLINDER ROD ASSY, LVL |
| 3 | 241202 | 1 | GLAND, 2-1/2" BORE X 1-1/2" ROD |
| 4 | 241203 | 1 | DETAIL, 2-1/2" PISTON, LV |
| 5 | 241103 | 1 | NYLOCK NUT, 3/4 - 16 UNF |
| B 6 | 818235 | 1 | GREASE FITTING, 1/8" NPT, STRAIGHT |
| A 7 | 241016 | 1 | VALVE, LOCKING, CPD-084P, PARKER |
| 8 | 241335 | 2 | 3/8 TUBE COMPRESSION FITTING TO #4 JIC MALE, 90 DEGREE |
| 9 | 108129 | 2 | TUBE NUT, 3/8" |
| 10 | 108130 | 2 | TUBE FERRULE, 3/8" |
| 11 | 241208 | 1 | O-RING; 2-330 |
| 12 | 241209 | 1 | BACK UP RING, 8-330 |
| 13 | 241105 | 1 | POLYPAK ROD SEAL 2500-1500 |
| 14 | 241106 | 1 | ROD WIPER 940-17 |
| 15 | 241107 | 1 | O-RING 2-210 |
| 16 | 241204 | 2 | POLYPAK PISTON SEAL 2500-2000 |

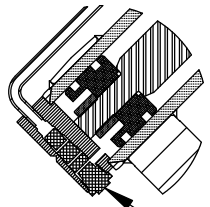
TORQUE:
300 ft-lbs




SECTION A-A
SCALE 7 : 16

14.56 CLOSED
D 21.81 OPEN




SECTION B-B
SCALE 1 : 6

## APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| D | 7/10/13 | 21.81 WAS 21.99 | BJF | |
| C | 4/2/13 | 241520 WAS 241516; REMOVED SPACER 241207 | BJF | |
| B | 2/29/12 | 818235 WAS 240123 | JTM | |
| A | 12/1/11 | 241016 WAS 241013 | JTM | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

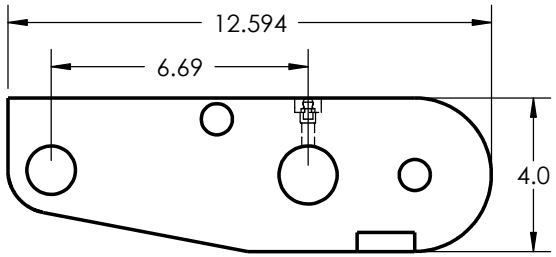
DRAWN BY: NEH
APPD BY:

TITLE: 1019 REAR HYDRAULIC CYLINDER, DRIVER SIDE, X-SH LINKS

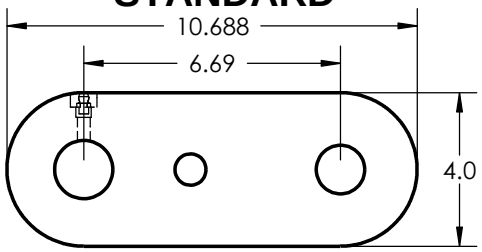
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 7/16/11
DRAWING NUMBER: 241507
REV: D

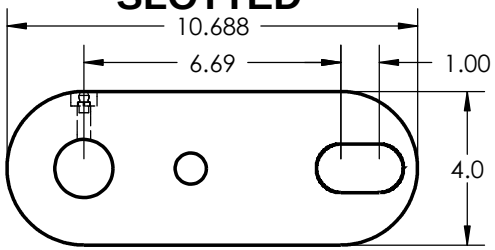
## UPPER



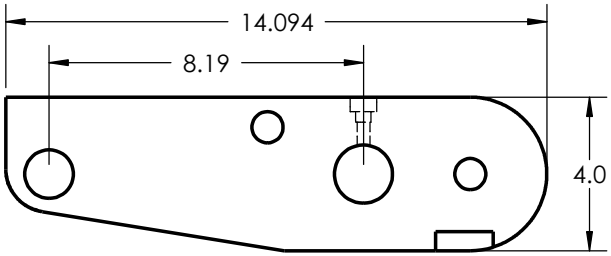

## LOWER - STANDARD (A)

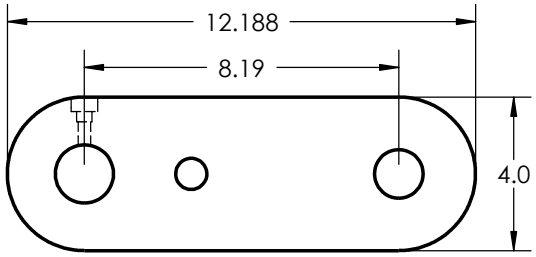


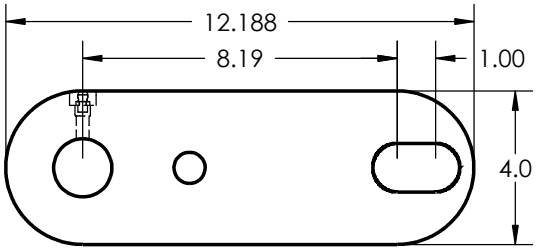

## LOWER- SLOTTED (A)



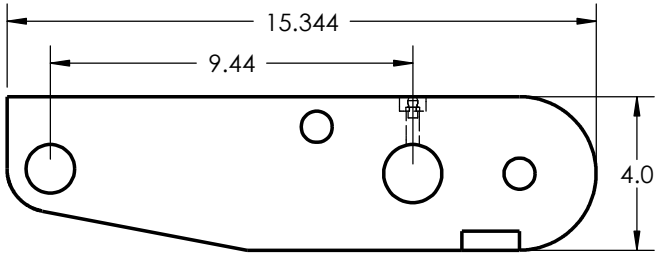

**X-SHORT**

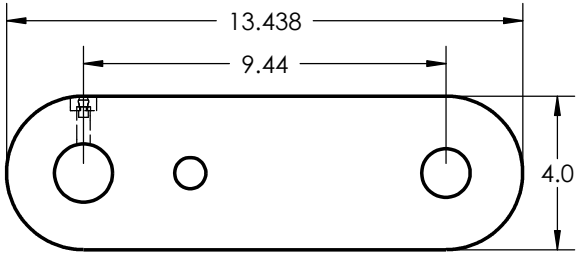


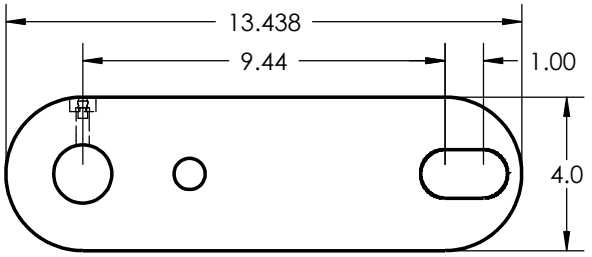




**STANDARD/SHORT**




**LONG**

NOTE: DMF LINKS COME IN 3 SIZES: X-SHORT, STD./SHORT, & LONG.
THE SIZES CAN NOT BE MIXED BETWEEN UPPER & LOWER LINKS.
*EXAMPLE: LONG UPPER LINK CAN ONLY BE USED WITH LONG LOWER LINK. EACH LINK HAS A SLOTTED VERSION.*

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 5/16/11 | ADDED CLARIFICATION OF UPPER VS. LOWER | NEH | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

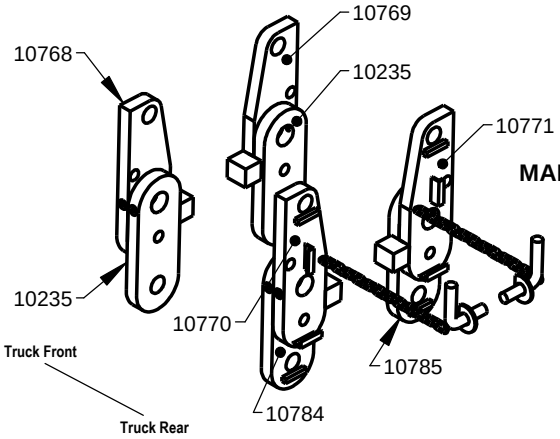
RW-1019/1212/1420

TITLE: RW- 1019 REAR LINK OPTIONS & DIMENSIONS

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| JBG | | 4/23/10 | M1019111 | A |

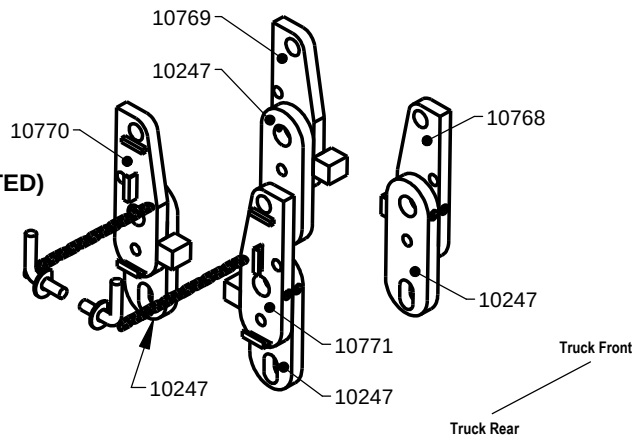
# X-SHORT LINKS




**MANUAL - XSHORT**
**P/N 10719**

**Note:** Links are sold individually unless you want a full set of all 8. Please refer to full set p/n's shown below.
The "Rear Set of Rear Links" differ in p/n's according to pin-off option. Your "Front Set of Rear Links" are the same, for x-short links, no matter what pin-off option you have.

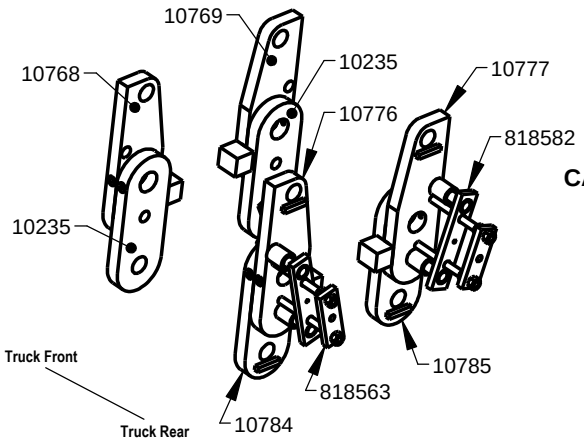
# X-SHORT (SLOTTED) LINKS




**MANUAL - XSHORT (SLOTTED)**
**P/N 10726**

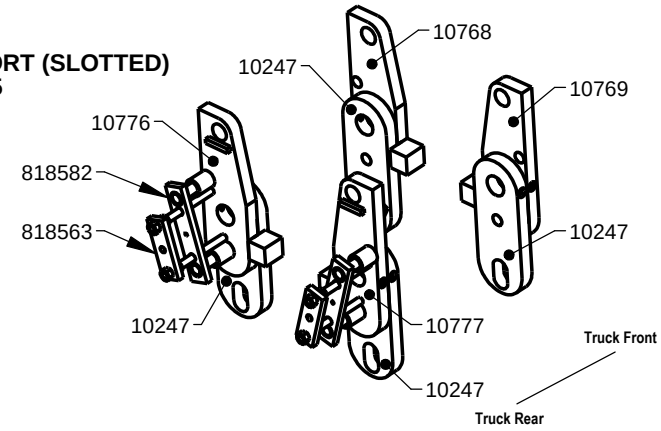
**AIR REMOTE - XSHORT**
**Not used for 1019, refer to 1420**

**AIR REMOTE - XSHORT (SLOTTED)**
**Not used for 1019, refer to 1420**



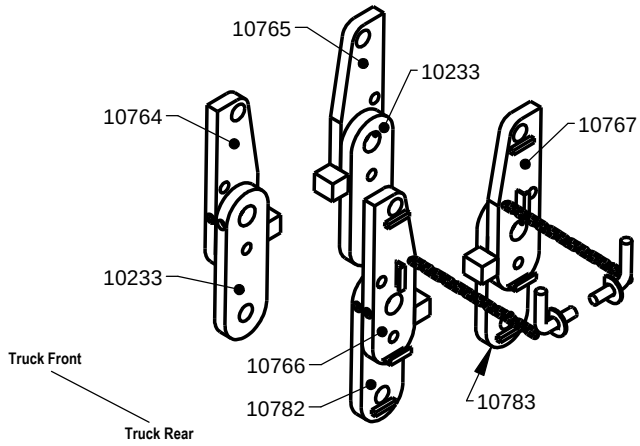

**CABLE REMOTE - XSHORT**
**P/N 10724**

**CABLE REMOTE - XSHORT (SLOTTED)**
**P/N 10725**




| TITLE: X-SHORT (STANDARD & SLOTTED LINKS) | | | |
|---|---|---|---|
| DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512 | | | |
| DATE: 5/2/2011 | DMF | DRAWING NUMBER: M1019107 | REV: # |

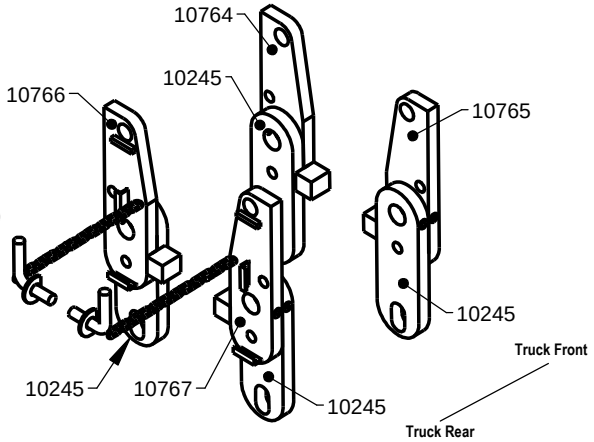
# SHORT LINKS




**MANUAL - SHORT**
**P/N 10717**

**Note:** Links are sold individually unless you want a full set of all 8. Please refer to full set p/n's shown below.
The "Rear Set of Rear Links" differ in p/n's according to pin-off option. Your "Front Set of Rear Links" are the same, for short links, no matter what pin-off option you have.

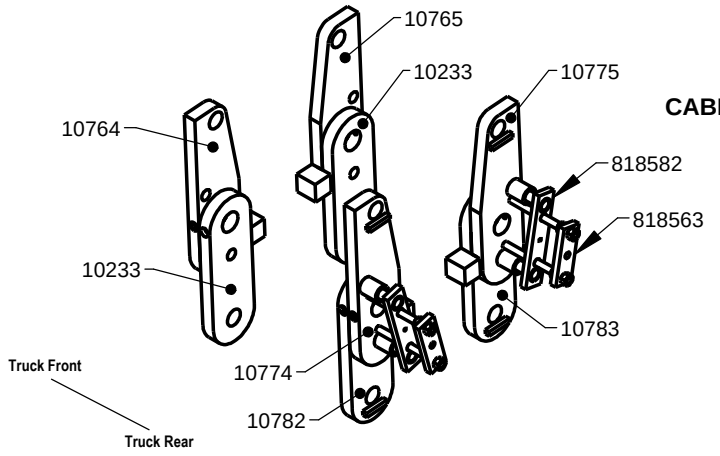
# SHORT (SLOTTED) LINKS



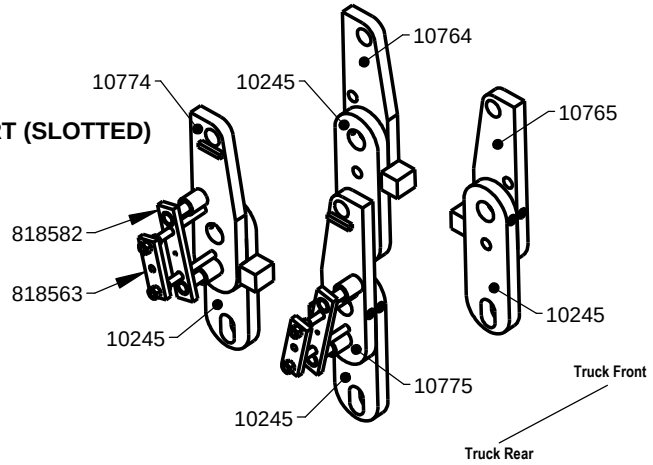

**MANUAL - SHORT (SLOTTED)**
**P/N 10718**

**AIR REMOTE - SHORT**
**Not used for 1019, refer to 1420**

**AIR REMOTE - SHORT (SLOTTED)**
**Not used for 1019, refer to 1420**



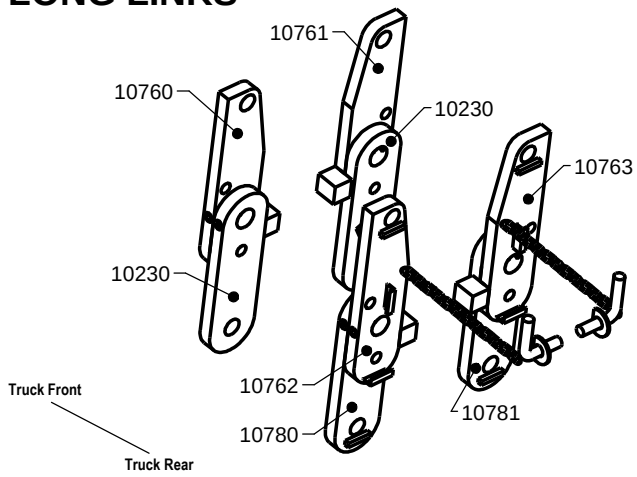

**CABLE REMOTE - SHORT**
**P/N 10722**




**CABLE REMOTE - SHORT (SLOTTED)**
**P/N 10723**

| TITLE: SHORT (STANDARD & SLOTTED LINKS) | | | |
|---|---|---|---|
| DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512 | | | |
| DATE: 5/3/2011 | DMF | DRAWING NUMBER: M1019108 | REV: # |

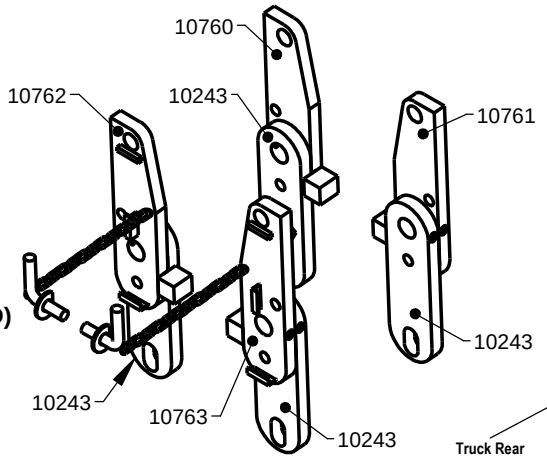
# LONG LINKS




**Note:** Links are sold individually unless you want a full set of all 8. Please refer to full set p/n's shown below.
The "Rear Set of Rear Links" differ in p/n's according to pin-off option. Your "Front Set of Rear Links" are the same, for short links, no matter what pin-off option you have.

**MANUAL - LONG**
**P/N 10715**

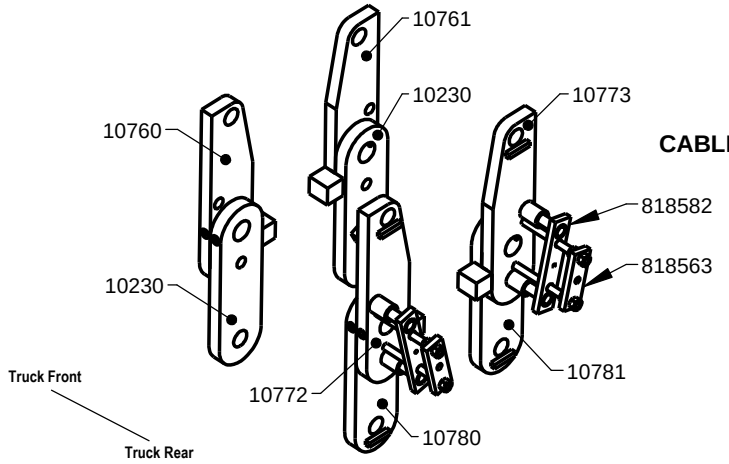
# LONG (SLOTTED) LINKS



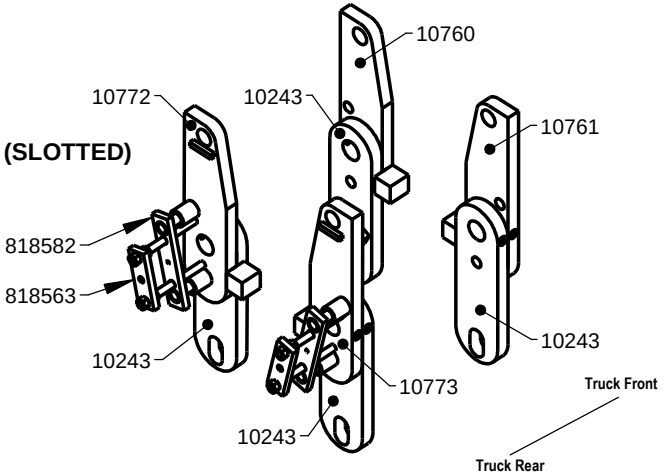

**MANUAL - LONG (SLOTTED)**
**P/N 10716**

**AIR REMOTE - LONG**
**Not used for 1019, refer to 1420**

**AIR REMOTE - LONG (SLOTTED)**
**Not used for 1019, refer to 1420**




**CABLE REMOTE - LONG**
**P/N 10720**




**CABLE REMOTE - LONG (SLOTTED)**
**P/N 10721**

| TITLE: LONG (STANDARD & SLOTTED LINKS) | | | |
|---|---|---|---|
| DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512 | | | |
| DATE: 5/3/2011 | DMF | DRAWING NUMBER: M1019109 | REV: # |

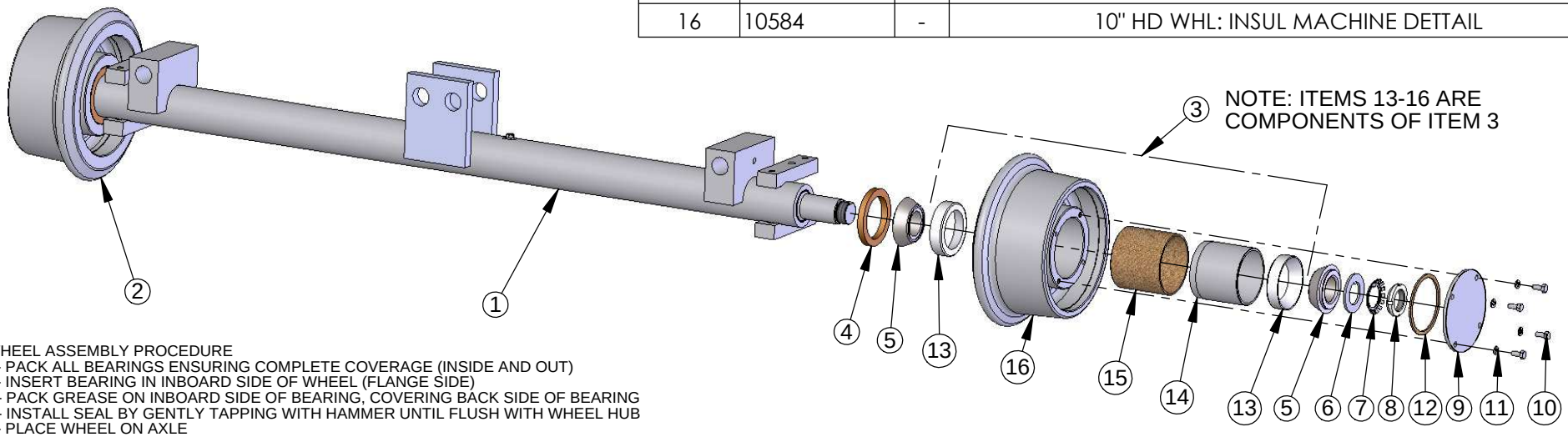
## PARTS: (MUST HAVE SERIAL # WHEN ORDERING)

COMPLETE REAR AXLE ASSEMBLY OPTIONS (AXLE, AXLE TUBE, AND WHEELS)
NON-INSULATED, WITH BRAKES - 10674
NON-INSULATED, NO BRAKES - 10670
INSULATED, WITH BRAKES - 10676
INSULATED, NO BRAKES - 10672

REAR AXLE TUBE OPTIONS:
W/ BRAKE SADDLES: 10680
NO BRAKE SADDLES: 10678

1019 WHEEL (W/RACES) OPTIONS:
INSULATED: 10580
NON-INSULATED: 10570

| ITEM NO. | PART NUMBER | QTY. | DESCRIPTION |
|---|---|---|---|
| 1 | 10680 | 1 | RW-1019-HD AXLE & TUBE REAR WELDMENT, W/ BRAKE SADDLES |
| 2 | 10570 | 1 | RW-1019-HD WHEEL,NON-INS., W/RACES |
| 3 | 10580 | 1 | RW-1019-HD WHEEL,INSULATED,w/RACES |
| 4 | 10592 | 2 | RW-1019-HD SEAL, STANDARD |
| 5 | 10591 | 4 | RW-1019-HD BEARING CONE |
| 6 | 10596 | 2 | WASHER,TONGUE (TIMKEN K-91508) |
| 7 | 10598 | 2 | WASHER, AXLE TAB (TIMKEN WH-08) |
| 8 | 10595 | 2 | NUT, AXLE (TIMKEN TN-08) |
| 9 | 10516 | 2 | RW-1019 HUBCAP, H.D. STYLE |
| 10 | 800109 | 8 | HUBCAP LOCK WASHERS, (LW-5/16) |
| 11 | 800108 | 8 | HUBCAP BOLTS, (HHCS 5/16-18X3/4") |
| 12 | 10586 | 1 | RW-1019-HD INSULATOR RING |
| 13 | 10590 | - | RW-1019-HD BEARING RACE |
| 14 | 10587 | - | 10" HD WHL STEEL SLEEVE DETAIL |
| 15 | 10588 | - | 10" HD WHL INSULATOR DETAIL |
| 16 | 10584 | - | 10" HD WHL: INSUL MACHINE DETTAIL |




WHEEL ASSEMBLY PROCEDURE
A- PACK ALL BEARINGS ENSURING COMPLETE COVERAGE (INSIDE AND OUT)
B- INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE)
C- PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING
D- INSTALL SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB
E- PLACE WHEEL ON AXLE
F- FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE
G- INSERT BEARING IN OUTBOARD SIDE OF WHEEL
H- INSTALL AXLE WASHERS ALIGNING THEM WITH KEYWAY (ITEMS 12 AND 13)
I- INSTALL AXLE NUT (ITEM 14)
J- ADJUST BEARING
   1- TIGHTEN WHEEL HEAVILY BY HAND (25-50 LB/FT)
   2- ROTATE WHEEL ONE FULL TURN IN BOTH DIRECTIONS TO SEAT BEARING
   3- BACK OFF NUT (ITEM 14) APPROXIMATELY 1/8 TO 1/4 TURN TO CREATE SLIGHT ENDPLAY
   4- WITH ONE HAND, FIRMLY GRAB WHEEL & ROTATE
   5- WHECK WHEEL ADJUSTMENT WITH A DIAL INDICATOR (IF AVAILABLE) OR FOLLOW THE GUIDELINES BELOW
      a- WHEEL SHOULD SPIN FREELY FOR AT LEAST 1/2 A TURN IF ROTATED HEAVILY BY HAND
      b- NO SIGNIFICANT ENDPLAY SHOULD BE FELT WHEN ROCKING THE WHEEL IN AND OUT
K- SELECT TABS ON AXLE WASHER THAT MOST NEARLY LINE UP WITH THE SLOTS IN THE AXLE NUT AND BEND THEM UP TO SECURE THE NUT
L- FILL OUTBOARD CAVITY WITH GREASE
M- RUN A BEAD OF SILICONE ON HUBCAP MOUNTING SURFACE (OUTBOARD FACE OF HUB)
N- INSTALL HUBCAP WITH PROVIDED HEX SCREWS

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 7/5/11 | UPDATED TO SHOW INSULATED ASSEMBLY | NEH | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

-

TITLE: REAR WHEEL & AXLE ASSEMBLY PARTS DIAGRAM RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/19/11 | M1019113 | A |

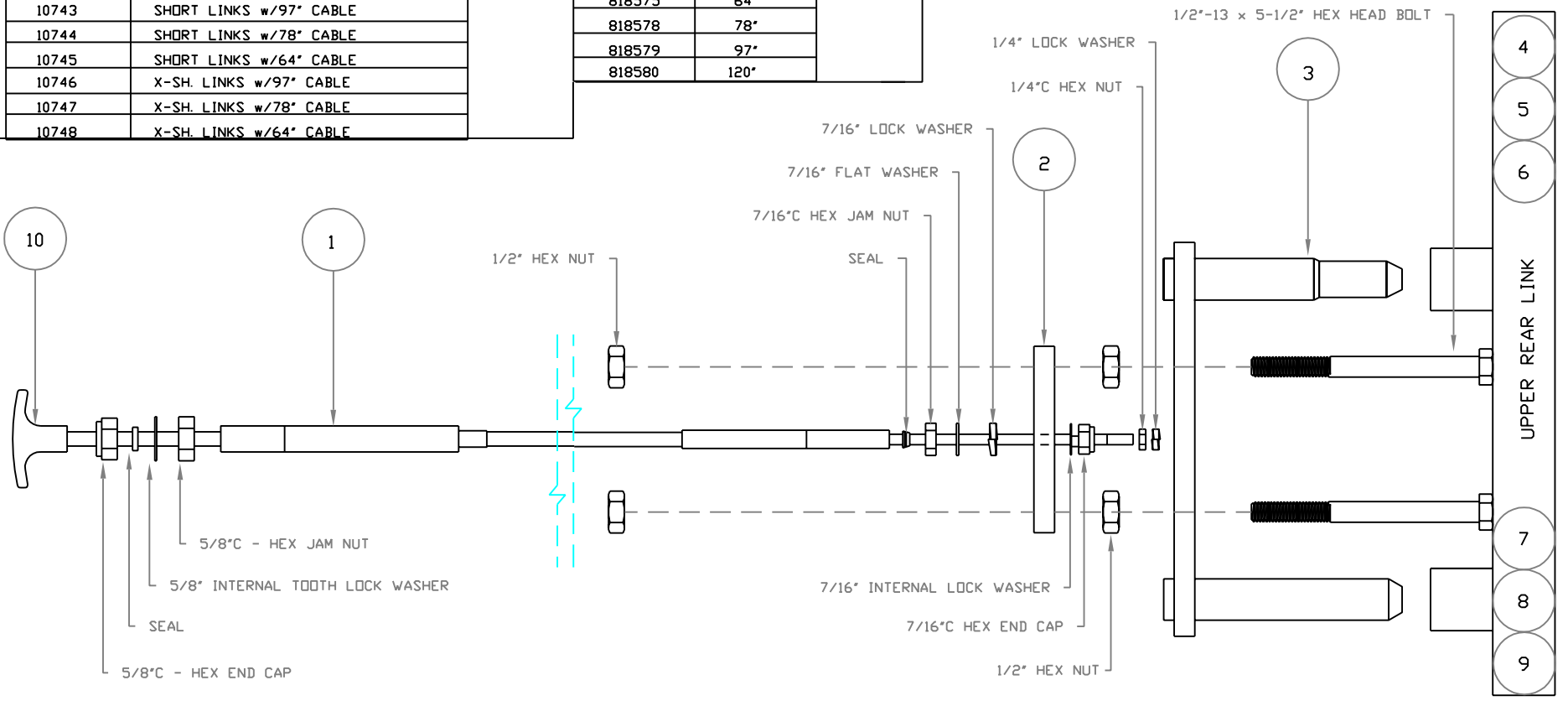
NOTE #2:
KIT INCLUDES ALL PARTS NEEDED TO CONVERT
MANUAL P/O's TO REMOTE CABLE OPERATED P/O's

| REMOTE PINOFF RETRO KITS | |
|---|---|
| P\N | DISCRIPTION |
| 10740 | LONG LINKS w/97" CABLE |
| 10741 | LONG LINKS w/78" CABLE |
| 10742 | LONG LINKS w/64" CABLE |
| 10743 | SHORT LINKS w/97" CABLE |
| 10744 | SHORT LINKS w/78" CABLE |
| 10745 | SHORT LINKS w/64" CABLE |
| 10746 | X-SH. LINKS w/97" CABLE |
| 10747 | X-SH. LINKS w/78" CABLE |
| 10748 | X-SH. LINKS w/64" CABLE |

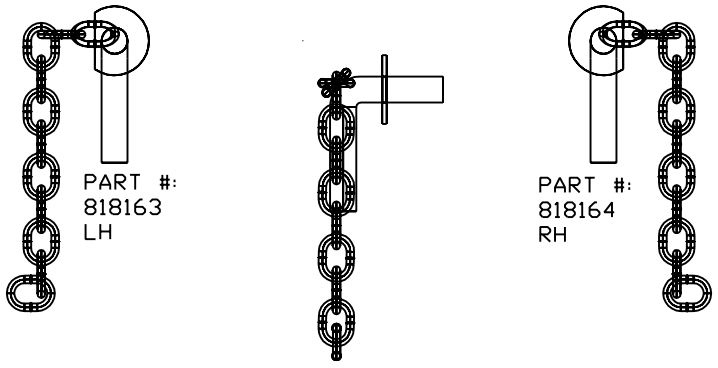
NOTE #1:
SPECIFY THE CABLE THAT
BEST FITS YOUR APPLICATION.

| REPLACEMENT CABLES | |
|---|---|
| P/N | LENGTH |
| 818581 | 30" |
| 818577 | 41" |
| 818576 | 50" |
| 818575 | 64" |
| 818578 | 78" |
| 818579 | 97" |
| 818580 | 120" |

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | NOTE 1 | 1 | REMOTE PIN-OFF CABLE (MORSE) |
| 2 | 818563 | 1 | REMOTE PIN-OFF MOUNTING PLATE |
| 3 | 818582 | 1 | REMOTE PIN-OFF ASSY. (5-3/8")(1019/1212/1420) |
| 4 | 10772 | 1 | LONG UPPER DRIVER REAR REMOTE LINK |
| 5 | 10773 | 1 | LONG UPPER PASSENGER REAR REMOTE LINK |
| 6 | 10774 | 1 | SHORT UPPER DRIVER REAR REMOTE LINK |
| 7 | 10775 | 1 | SHORT UPPER PASSENGER REAR REMOTE LINK |
| 8 | 10776 | 1 | X-SHORT UPPER DRIVER REAR REMOTE LINK |
| 9 | 10777 | 1 | X-SHORT UPPER PASSENGER REAR REMOTE LINK |
| 10 | 818571 | 1 | REMOTE PIN-OFF "T-HANDLE" (MORSE) |




MANUAL PIN/OFFS




| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES:
(UNLESS SPECIFIED)
COMMON SENSE PREVAILS
FRAC. MACH: ± 1/32"
FRAC. OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

DRAWN BY: NEH
APPD BY:

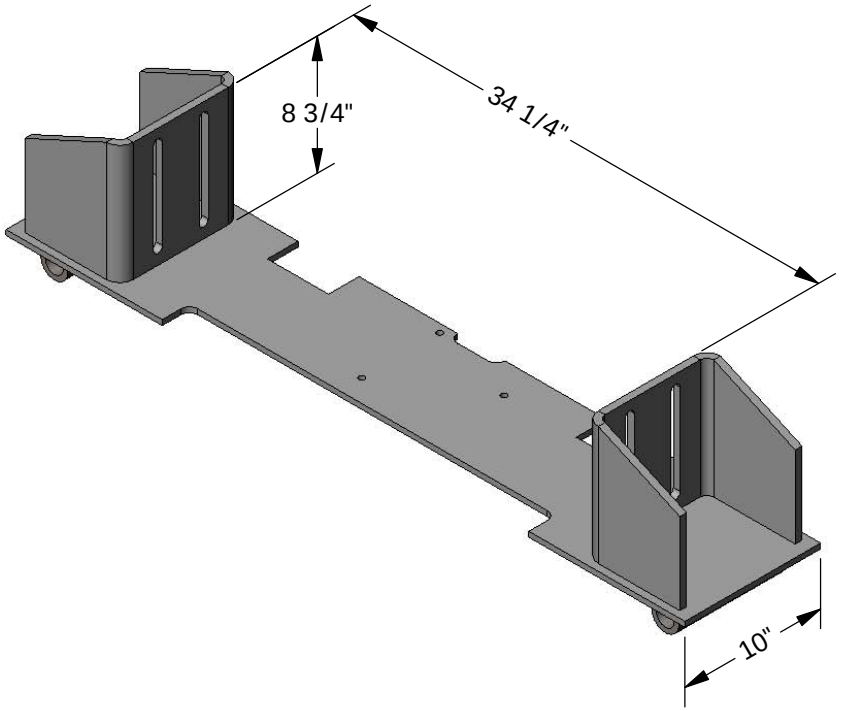
TITLE:
MANUAL, REAR RAILGEAR RETENTION OPTIONS-RW1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 5/2/11

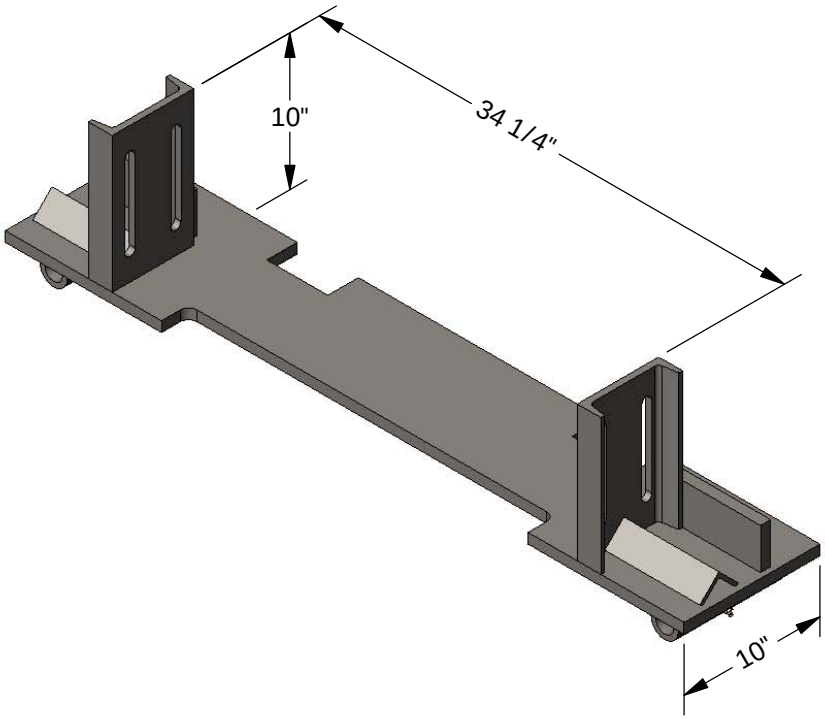
DRAWING NUMBER: M1019123

REV: #




PART # 10083 - STANDARD 1019 REAR BRACKET

NOTE: THIS IS THE DEFAULT CONFIGURATION FOR THE REAR BRACKET ON ALL 1019 SERIES ASSEMBLIES. OTHER CONFIGURATIONS ARE AVAILABLE TO FIT YOUR SPECIFIC NEEDS. CONTACT DMF FOR INFORMATION ON ALTERNATE CONFIGURATIONS.




A

PART # 10246 - SPECIALTY TRANSIT BRACKET (FORD ONLY)

NOTE: SPECIALTY REAR BRACKET FOR TIGHT CURVATURE SPECIFICATIONS. CURRENTLY ONLY AVAILABLE FOR THE FORD F-4/550. CONTACT DMF WITH QUESTIONS ABOUT POSSIBLE SOLUTIONS FOR OTHER CHASSIS.

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 10/14/14 | 10246 WAS 10199 | JDI | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES ( 0.030 X 45° MAX )

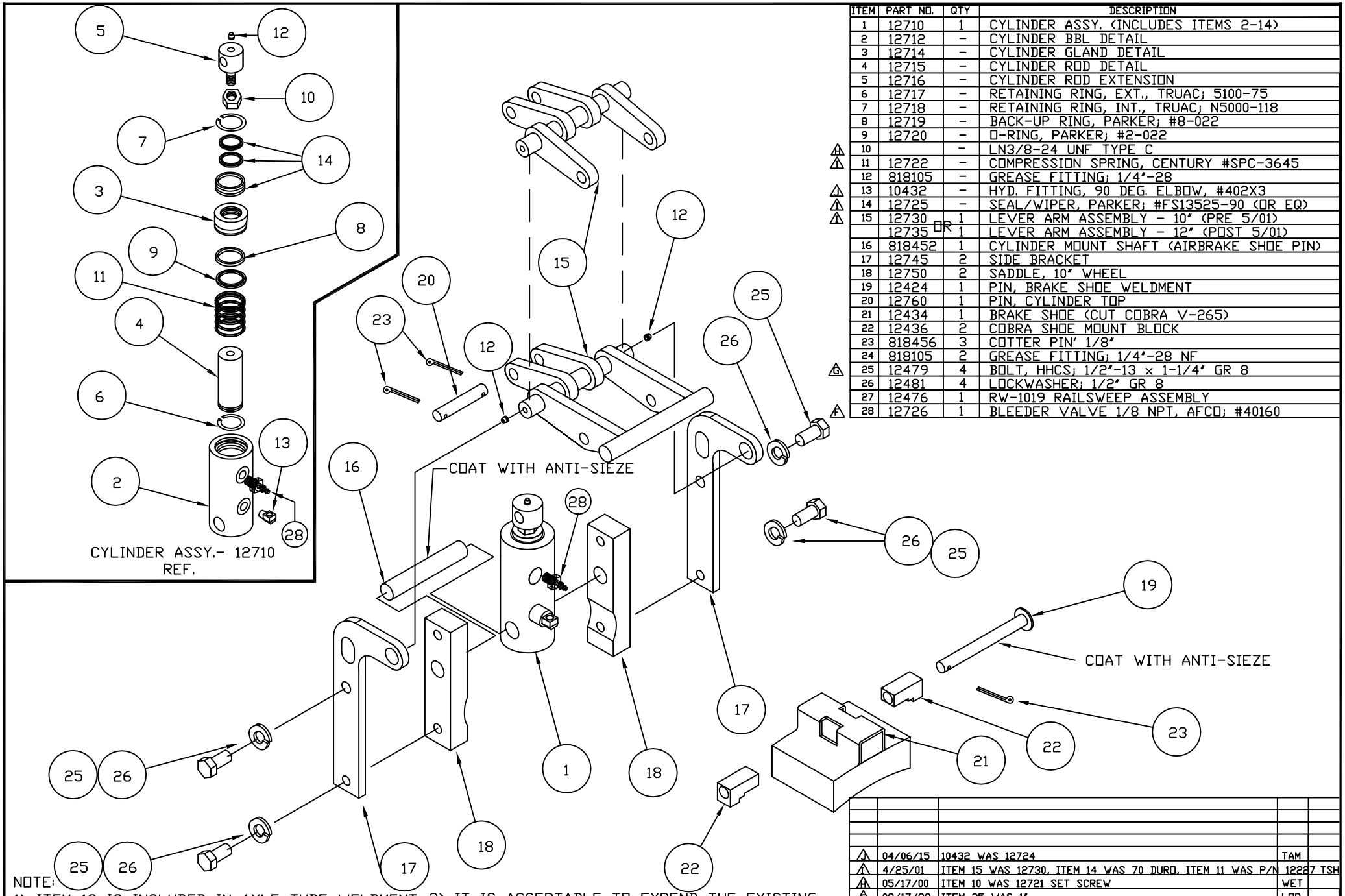
-

| DRAWN BY: | APPD BY: |
|---|---|
| NEH | |

TITLE: MANUAL, REAR BRACKET OPTIONS AND DIMENSIONS, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DATE: | DRAWING NUMBER: | REV: |
|---|---|---|
| 5/5/11 | M1019130 | A |




| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 12710 | 1 | CYLINDER ASSY. (INCLUDES ITEMS 2-14) |
| 2 | 12712 | - | CYLINDER BBL DETAIL |
| 3 | 12714 | - | CYLINDER GLAND DETAIL |
| 4 | 12715 | - | CYLINDER ROD DETAIL |
| 5 | 12716 | - | CYLINDER ROD EXTENSION |
| 6 | 12717 | - | RETAINING RING, EXT., TRUAC; 5100-75 |
| 7 | 12718 | - | RETAINING RING, INT., TRUAC; N5000-118 |
| 8 | 12719 | - | BACK-UP RING, PARKER; #8-022 |
| 9 | 12720 | - | O-RING, PARKER; #2-022 |
| 10 | | - | LN3/8-24 UNF TYPE C |
| 11 | 12722 | - | COMPRESSION SPRING, CENTURY #SPC-3645 |
| 12 | 818105 | - | GREASE FITTING; 1/4"-28 |
| 13 | 10432 | - | HYD. FITTING, 90 DEG. ELBOW, #402X3 |
| 14 | 12725 | - | SEAL/WIPER, PARKER; #FS13525-90 (OR EQ) |
| 15 | 12730 | 1 | LEVER ARM ASSEMBLY - 10" (PRE 5/01) |
| | 12735 OR | 1 | LEVER ARM ASSEMBLY - 12" (POST 5/01) |
| 16 | 818452 | 1 | CYLINDER MOUNT SHAFT (AIRBRAKE SHOE PIN) |
| 17 | 12745 | 2 | SIDE BRACKET |
| 18 | 12750 | 2 | SADDLE, 10" WHEEL |
| 19 | 12424 | 1 | PIN, BRAKE SHOE WELDMENT |
| 20 | 12760 | 1 | PIN, CYLINDER TOP |
| 21 | 12434 | 1 | BRAKE SHOE (CUT COBRA V-265) |
| 22 | 12436 | 2 | COBRA SHOE MOUNT BLOCK |
| 23 | 818456 | 3 | COTTER PIN' 1/8" |
| 24 | 818105 | 2 | GREASE FITTING; 1/4"-28 NF |
| 25 | 12479 | 4 | BOLT, HHCS; 1/2"-13 x 1-1/4" GR 8 |
| 26 | 12481 | 4 | LOCKWASHER; 1/2" GR 8 |
| 27 | 12476 | 1 | RW-1019 RAILSWEEP ASSEMBLY |
| 28 | 12726 | 1 | BLEEDER VALVE 1/8 NPT, AFCO; #40160 |

NOTE:

1) ITEM 18 IS INCLUDED IN AXLE TUBE WELDMENT WELDMENT (2) ARE REQUIRED FOR ASSEMBLY TO EXISTING UNITS.

2) RAILSWEEP ASSEMBLY, ITEM #27, NOT SHOWN.
⚠ RAILSWEEP BRACKET ATTACHES TO SADDLE, ITEM #17, USING ITEMS #25 & #26 MOUNTING HARDWARE.

3) IT IS ACCEPTABLE TO EXPEND THE EXISTING ⚠ STOCK OF ITEM #25 ON THIS ASSEMBLY BEFORE CHANGING BOLT LENGTH.

4) EQUIVALENT SEAL/WIPER:
⚠ SHAMBAN #S48317-00750A-448

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| ⚠ | 04/06/15 | 10432 WAS 12724 | TAM | |
| ⚠ | 4/25/01 | ITEM 15 WAS 12730. ITEM 14 WAS 70 DURO. ITEM 11 WAS P/N 12287 | TSH | |
| ⚠ | 05/17/00 | ITEM 10 WAS 12721 SET SCREW | WET | |
| ⚠ | 09/17/98 | ITEM 25 WAS 1" | LDR | |
| ⚠ | 05/07/98 | ADDED ITEM #28 | KLC | TSH |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC. MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

TITLE: ASSEMBLY DETAIL - 10"

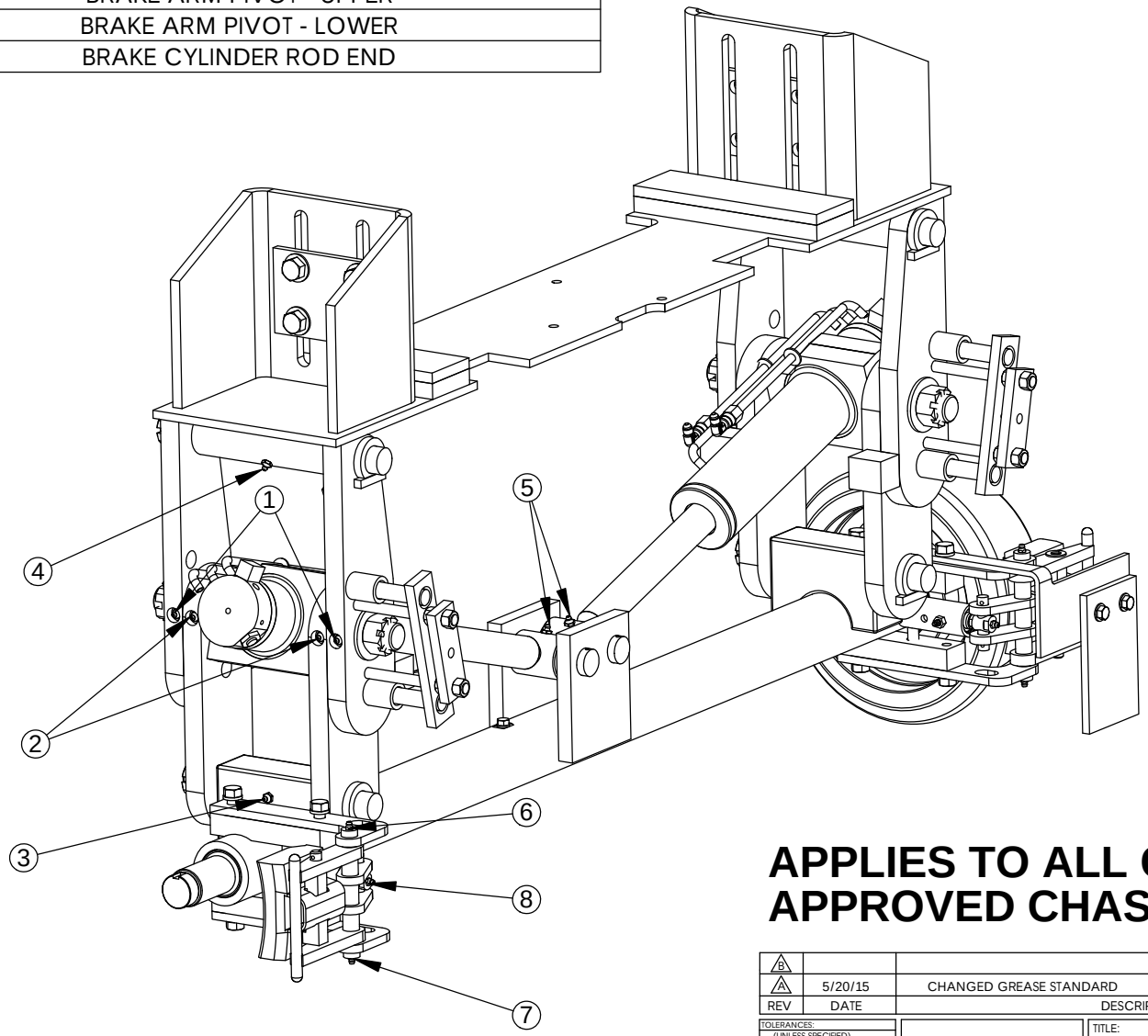
DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| MRV | TSH | 11/28/95 | 12700 | J |

| LOCATION | QTY | DESCRIPTION |
|---|---|---|
| 1 | 4 | UPPER LINK MAIN PIVOT |
| 2 | 4 | LOWER LINK MAIN PIVOT |
| 3 | 2 | AXLE SADDLE PIVOT |
| 4 | 2 | CROSSTUBE PIVOT |
| 5 | 2 | CYLINDER ROD END |
| 6 | 2 | BRAKE ARM PIVOT - UPPER |
| 7 | 2 | BRAKE ARM PIVOT - LOWER |
| 8 | 2 | BRAKE CYLINDER ROD END |

LUBRICATION SPECIFICATION:

- **Factory Standard:** Citgo Syndurance Premium Synthetic 460 # 2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)




NOTE: LOCATIONS TYPICAL BOTH SIDES

*AS A WEEKLY PREVENTITIVE MAINTENANCE PROCEDURE: GREASE ALL LOCATIONS AND CHECK FOR UNUSUAL WEAR

# APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 5/20/15 | CHANGED GREASE STANDARD | JDI | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES ( 0.030 X 45° MAX )

-

TITLE: MANUAL, REAR GREASE POINT LOCATIONS, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/21/11 | M1019118 | A |

### 5.5.1 Before Ordering Parts – Front Railgear

Required Information for Ordering Parts:

- You must have the Railgear serial number when ordering parts. This uniquely identifies your Railgear, as it was built to your specifications, and also allows DMF to help you maintain a history of your Railgear. If you are placing a parts order through a maintenance facility, please inform them of the serial number, so that they can relay the information when placing your order.

- Returns: DMF has a Return Authorization Procedure. You must contact DMF for an RA# before returning any parts for any reason. Parts will not be credited without an RA#.

- Labor: In extremely rare situations, on a discretionary basis, and with prior approval, DMF will reimburse certain, specific labor costs. If you feel this may apply in your situation, you must contact DMF's Service Department for a Service Authorization Number (SA#). No labor will be reimbursed without an SA#. The SA# must be included on your request for reimbursement.

- Please use driver's side / passenger's side terminology (instead of left/right side) when describing issues with your Railgear. This ensures that everyone involved is clear about where the issue is occurring.

Other Considerations for Ordering Parts:

This is a list of considerations to make before placing a parts order with DMF. There are many variations and customer requirements that we strive to accommodate, and as a result, the more information you can provide to us when placing an order, the more likely that we will be able to help you quickly and efficiently.

- Cross Tubes, Spring Hangers, and Long Arms are available in a variety of sizes and lengths. Please be sure to check drawings for details before placing your order.

Wheels:

- If you are a customer using special wheel profiles (this is especially prevalent in Metros), please be sure to inform the DMF Parts Department that there may be a special wheel profile involved in your order.

- DMF offers both insulated and non-insulated wheels. Please confirm which wheel you need before ordering. Insulated wheels can be identified by a grooved ring machined around the inside of the rail wheel. This grooved ring can been seen and felt, and is located about an inch in from the outside tread.

Cylinders:

- The driver's side and passenger's side cylinders are different – please see information on drawing to determine which cylinder you need to order.

Frame Extensions:

- Please call DMF for assistance. The truck year and model number must be provided, so that DMF can correctly identify the frame extension needed.

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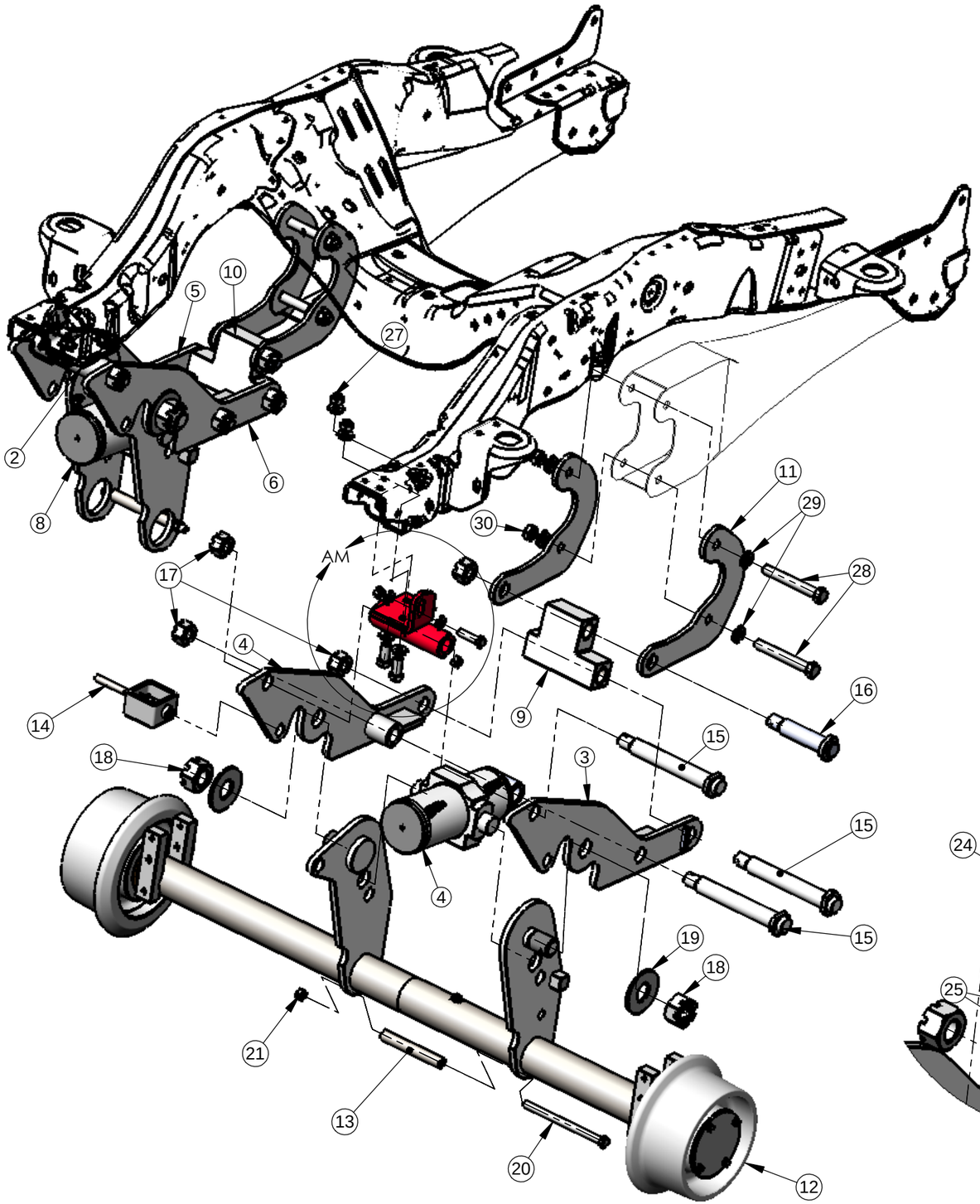
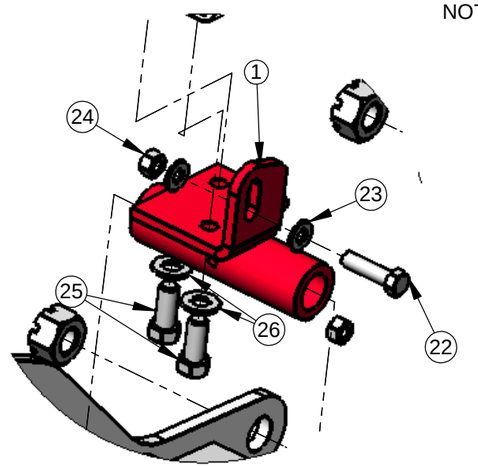
NOTE: DRAWING IS FOR ILLUSTRATIVE PURPOSES,
YOUR PARTS MAY NOT BE EXACTLY AS PICTURED




DETAIL AM
SCALE 1 : 5

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 11424 | WELDMENT,FRONTBK,DS,1019,08F-4/550 | 1 |
| 2 | 11425 | WELDMENT,FRONTBK,PS,1019,08F-4/550 | 1 |
| 3 | 11445 | LARM WLDMT,1019,08F4/5,DS OUTER | 1 |
| 4 | 11446 | LARM WLDMT,1019,08F4/5,DS INNER | 1 |
| 5 | 11447 | LARM WLDMT,1019,08F4/5,PS OUTER | 1 |
| 6 | 11448 | LARM WLDMT,1019,08F4/5,PS INNER | 1 |
| 7 | 240800 | HYD.CYL.ASSY.,FRONT LH (3-1/2")(3500HD) | 1 |
| 8 | 240801 | HYD.CYL.ASSY.,FRONT RH (3-1/2")(3500HD) | 1 |
| 9 | 11451 | ASSY, SWINGLINK, RW1019 DS | 1 |
| 10 | 11452 | ASSY, SWINGLINK, RW1019 PS | 1 |
| 11 | 11437 | AXLE BRACKET DETAIL, RW-1019, 08F4/550 | 4 |
| 12 | 11668 | RW1019HD FRONT AXLE,ICF,08 F-4/550 | 1 |
| 13 | 11079 | RW-1019 TIE PIN SPACER TUBE | 2 |
| 14 | 818700 | REM. CABLE P/O ASSY.,FRONT (3/4" PIN)(1019) | 1 |
| 15 | 11124 | RW-1019 PIN ASSY.,FRONT (1-1/4"DIAX10-1/4"L) | 8 |
| 16 | 11450 | RW-1019 REAR PIN ASSY FOR SWING BLOCK | 2 |
| 17 | 818127 | RW-1630 FRONT HEX NUT, SLOTTED (SLHN;1"-8) | 8 |
| 18 | 818134 | RW-1630 FRONT HEX NUT, SLOTTED (SLHN; 1-1/2"-6) | 4 |
| 19 | 818136 | RW-1630 FRONT WASHER, FLAT (FW-1-1/2") | 4 |
| 20 | HHCS1/2-13X8GR8 | HEX HD CAP SCREW 1/2-13 X 8" GRADE 8 | 2 |
| 21 | HN1/2-13 | 1/2-13 HEX NUT | 2 |
| 22 | HHCS1/2-13X2GR8 | HEX HD CAP SCREW 1/2-13 X 2" GRADE 8 | 2 |
| 23 | FW1/2 | 1/2" FLAT WASHER | 4 |
| 24 | LN1/2-13 | 1/2-13 NYLOCK NUT | 2 |
| 25 | HHCS5/8-11X1-3/4GR8 | HEX HD CAP SCREW 5/8-11 X 1-3/4" GRADE 8 | 4 |
| 26 | FW5/8 | 5/8" FLAT WASHER | 8 |
| 27 | LN5/8-11 | 5/8-11 NYLOCK NUT | 4 |
| 28 | HHCSM18X140 | HES HD CAP SCREW M18-2.5X140 | 4 |
| 29 | FWM18 | M18 FLAT WASHER | 8 |
| 30 | LNM18 | M18-2.5 NYLOCK NUT | 4 |
| NS | 818137 | RW-1630 FRONT COTTER PIN (1/4"X2-1/2") | 4 |
| NS | 818128 | RW-1630 FRONT COTTER PIN (3/16"X2") | 8 |

NOTE: NS = NOT SHOWN ON DRAWING

*MUST HAVE SERIAL # WHEN ORDERING PARTS*
DEPENDING ON OPTIONS, PART #'S MAY VARY;
SEE LONG ARM VARIATIONS IN SECTION 5.5

# FORD F-4/550 FRONT ASSY. PARTS DIAGRAM

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.030"X 45° MAX.)

-

DRAWN BY: NEH
APPD BY:

TITLE: MANUAL, '08 F-550 FRONT ASSY PART DIAGRAM, RW-1019

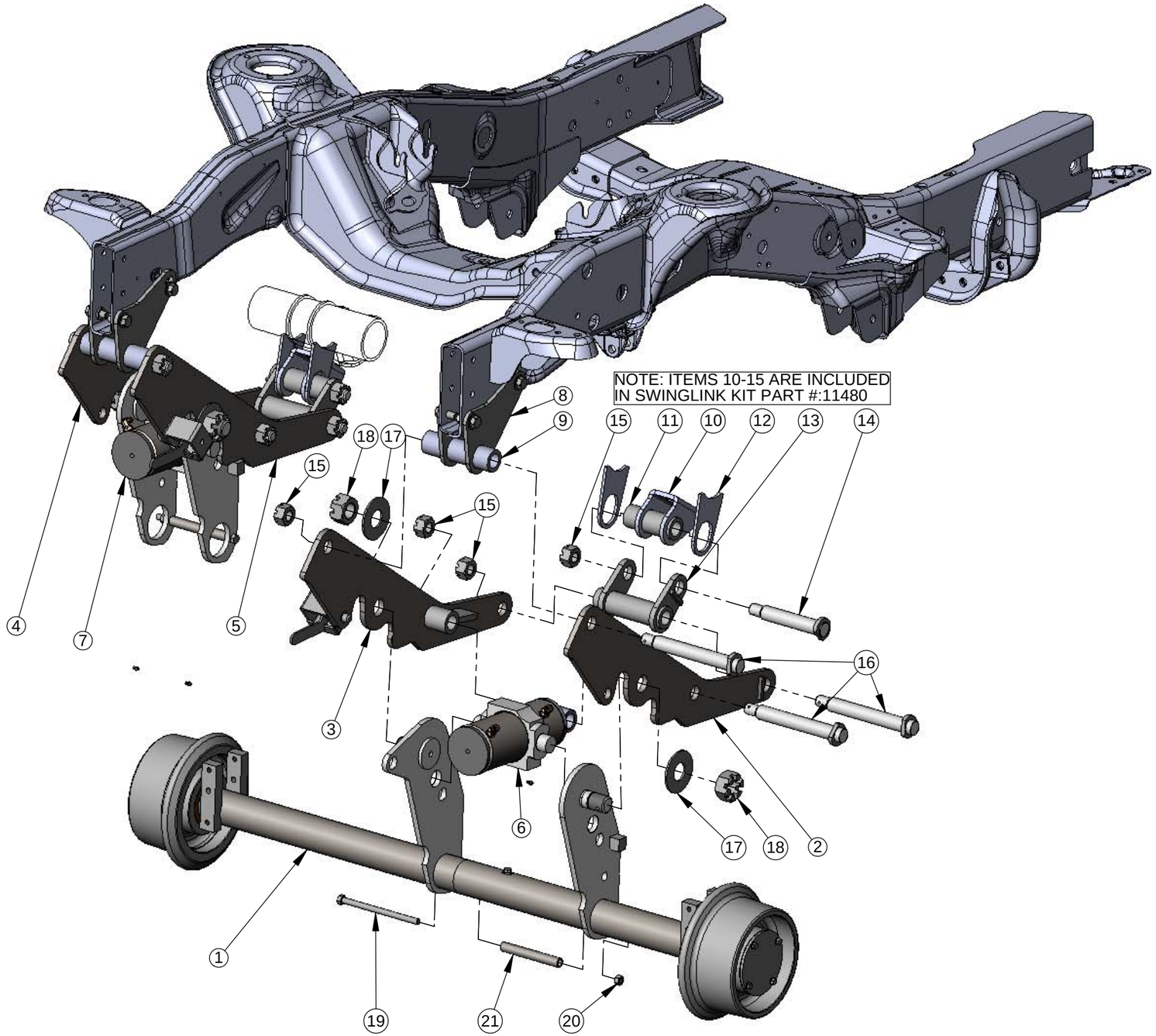
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 4/18/11

DRAWING NUMBER: M1019101

REV: #

NOTE: DRAWING IS FOR ILLUSTRATIVE PURPOSES,
YOUR PARTS MAY NOT BE EXACTLY AS PICTURED




| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 11660 | RW1019HD FRONT AXLE,ICF,08 F-4/550 | 1 |
| 2 | 11472 | LARM WLDMT,1019,08DODGE/STER4/5,DS OUTER | 1 |
| 3 | 11493 | LARM WLDMT,1019,08DODGE/STER4/5,DS INNER,LPO | 1 |
| 4 | 11474 | LARM WLDMT,1019,08DODGE/STER4/5,PS OUTER | 1 |
| 5 | 11477 | LARM WLDMT,1019,08DODGE/STER4/5,PS INNER,LPO | 1 |
| 6 | 240800 | HYD.CYL.ASSY.,FRONT LH (3-1/2")(3500HD) | 1 |
| 7 | 240801 | HYD.CYL.ASSY.,FRONT RH (3-1/2")(3500HD) | 1 |
| 8 | 11494 | FRONT FRAME BRACKET | 1 |
| 9 | 818328 | FRONT CROSS TUBE DETAIL | 1 |
| 10 | 11485 | DET,FRAME BKT,FORMED,1019 STER/DGD 4/5500 | 1 |
| 11 | 11488 | DET.AXLE BKT TUBE,08STER/DGD 4/5500 | 4 |
| 12 | 11484 | AXLE BRACKET SIDE PLATE | 1 |
| 13 | 11492 | WLDMT,LOWER SWING LINK,STERLING/DODGE 4/5500 | 2 |
| 14 | 11495 | WMT,PIN,SWG LNK,08STR/DGD 4/5500 | 1 |
| 15 | 818127 | RW-1630 FRONT HEX NUT, SLOTTED (SLHN;1"-8) | 8 |
| 16 | 11124 | RW-1019 PIN ASSY.,FRONT (1-1/4"DIAX10-1/4"L) | 2 |
| 17 | 818136 | RW-1630 FRONT WASHER, FLAT (FW-1-1/2") | 8 |
| 18 | 818134 | RW-1630 FRONT HEX NUT, SLOTTED (SLHN; 1-1/2"-6) | 4 |
| 19 | HHCS1/2-13X8GR8 | HEX HD CAP SCREW 1/2-13 X 8" GRADE 8 | 2 |
| 20 | HN1/2-13 | 1/2-13 HEX NUT | 2 |
| 21 | 11079 | RW-1019 TIE PIN SPACER TUBE | 2 |
| NS | 818137 | RW-1630 FRONT COTTER PIN (1/4"X2-1/2") | 4 |
| NS | 818128 | RW-1630 FRONT COTTER PIN (3/16"X2") | 8 |

NOTE: NS = NOT SHOWN ON DRAWING

*MUST HAVE SERIAL # WHEN ORDERING PARTS*
DEPENDING ON OPTIONS, PART #'S MAY VARY;
SEE LONG ARM VARIATIONS IN SECTION 5.5

# DODGE/STERLING 45/5500
# FRONT ASSY. PARTS DIAGRAM

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.030 X 45° MAX.)

-

DRAWN BY: NEH
APPD BY:

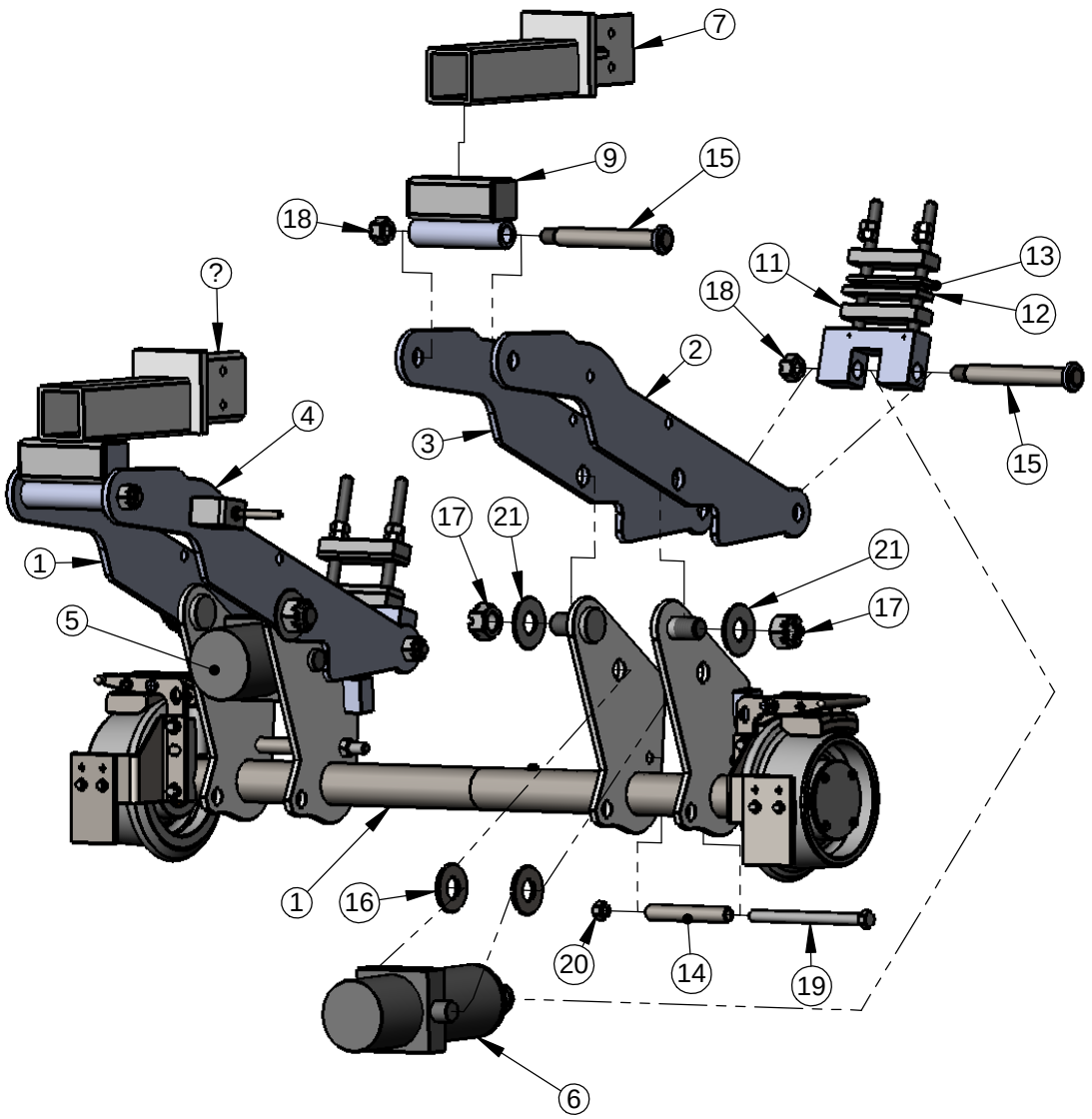
TITLE: MANUAL, '08 DODGE/STER 4/5500 FRONT ASSY PARTS DIAGRAM, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 4/27/11

DRAWING NUMBER: M1019120

REV: #




| LABEL | PART NO. | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 11663 | RW-1019HD FRONT AXLE,IDF,4500 W/ 1212 PIVOT ARMS | 1 |
| 2 | 12124 | RW-1212 FRONT LONG ARM DETAIL | 2 |
| 3 | 12178 | RW-1212/1420 LONG ARM WLDMT, FRONT INNER LH, REM P/O'S | 1 |
| 4 | 12179 | RW-1212/1420 LONG ARM WLDMT, FRONT INNER RH, REM P/O'S | 1 |
| 5 | 240100 | HYD.CYL.ASSY.,FRONT RH (4-1/2" X 9-1/2" STROKE) | 1 |
| 6 | 240099 | HYD.CYL.ASSY.,FRONT RH (4-1/2" X 9-1/2" STROKE) | 1 |
| 7 | 810236 | '03 KODIAK FRAME EXTENSION FOR RW-1019 (DRIVER'S SIDE) | 1 |
| 8 | 810234 | '03 KODIAK FRAME EXTENSION FOR RW-1019 (PASS. SIDE) | 1 |
| 9 | 810154 | CROSS TUBE MOUNTING BLOCK (3") | 2 |
| 10 | 818155 | 4" SPRING HANGER BRACKET w/NUTS | 2 |
| 11 | 818160 | RW-1630 SPRING BRACKET SPACER (1"X2") | 6 |
| 12 | 818158 | RW-1630 SPRING BRACKET SPACER (1/2"X2") | 2 |
| 13 | 818153 | RW-1630 SPRING BRACKET RUBBER MOUNTING STRIP | 2 |
| 14 | 12044 | RW-1212/1420 PIVOT ARM TIE PIN SPACER TUBE | 2 |
| 15 | 10124 | RW-1212/1420 PIN ASSY.,FRONT | 4 |
| 16 | 12052 | RW-1212/1420 FRONT CYL.SPACER | 4 |
| 17 | 818134 | RW-1630 FRONT HEX NUT, SLOTTED (1-1/2"-6) | 4 |
| 18 | 818127 | RW-1630 FRONT HEX NUT, SLOTTED (1"-8) | 4 |
| 19 | 12042 | RW-1212 PIVOT ARM TIE PIN DETAIL | 2 |
| 20 | HN3/4-10GR8 | HEX NUT 3/4-10 GRADE 8 | 2 |
| 21 | 818136 | RW-1630 FRONT WASHER, FLAT (FW1-1/2) | 4 |
| NS | 818137 | RW-1630 FRONT COTTER PIN (1/4"X2-1/2") | 4 |
| NS | 818128 | RW-1630 FRONT COTTER PIN (3/16"X2") | 4 |

NOTE: NS = NOT SHOWN ON DRAWING

# GM/CHEVY 45/5500 FRONT ASSY. PARTS DIAGRAM

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES (0.030 X 45° MAX.)

-

DRAWN BY: NEH

APPD BY:

TITLE: MANUAL, '08 C4/5500 FRONT ASSY PARTS DIAGRAM, RW-1019

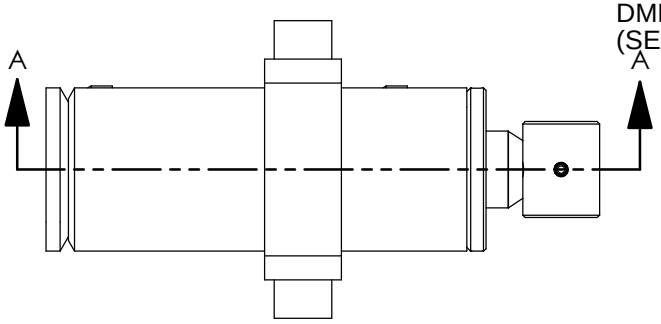
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 4/18/11

DRAWING NUMBER: M1019110

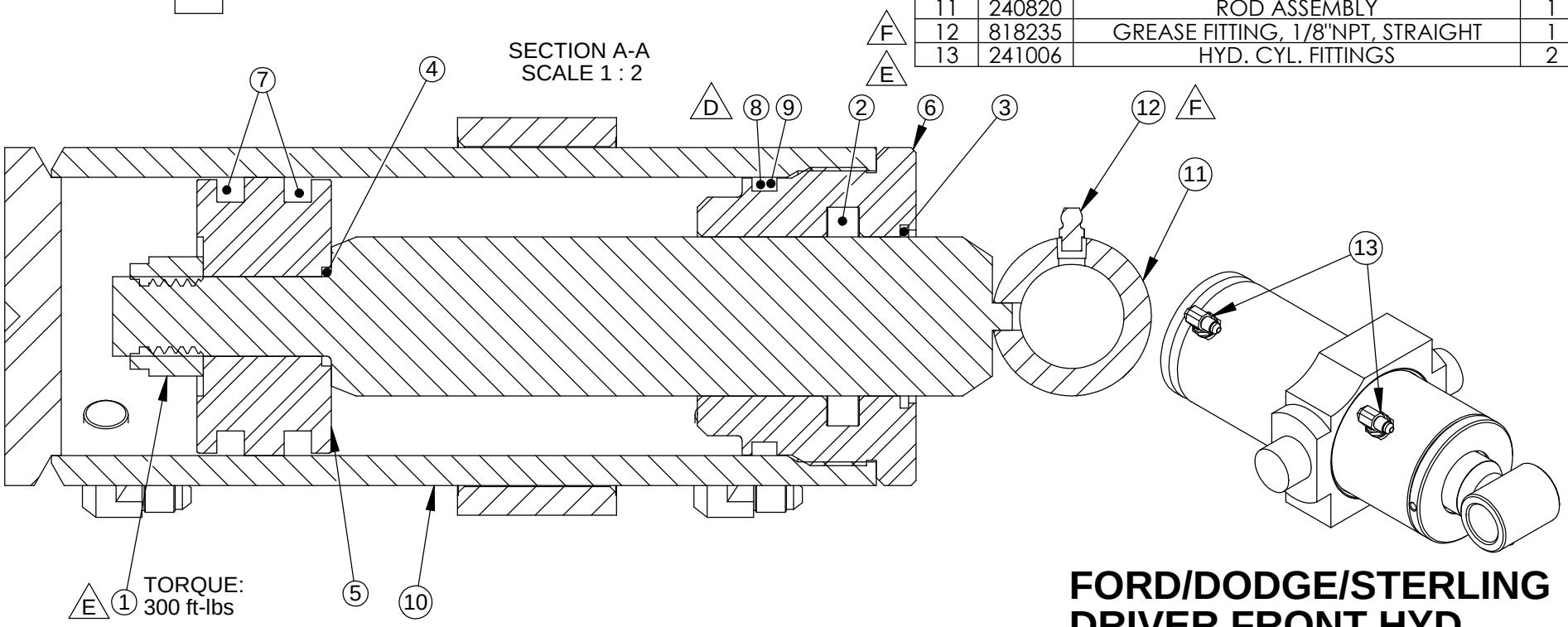
REV: #

DMF P/N 240225 - SEAL KIT
(SEAL KIT INCLUDES ITEM #'S 2,3,4,8,9,10




| ITEM | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 240103 | 1" NUT | 1 |
| 2 | 240105 | ROD SEAL | 1 |
| 3 | 240106 | WIPER 959-21 AN-21 | 1 |
| 4 | 240107 | O'RING 2-214 | 1 |
| 5 | 240201 | PISTON | 1 |
| 6 | 240202 | GLAND | 1 |
| 7 | 240204 | PISTON SEAL 3120-2875 | 2 |
| 8 | 240208 | O'RING 2-338 | 1 |
| 9 | 240209 | B'UP RING 8-338 | 1 |
| 10 | 240810 | TUBE ASSEMBLY | 1 |
| 11 | 240820 | ROD ASSEMBLY | 1 |
| 12 | 818235 | GREASE FITTING, 1/8"NPT, STRAIGHT | 1 |
| 13 | 241006 | HYD. CYL. FITTINGS | 2 |

SECTION A-A
SCALE 1 : 2




# FORD/DODGE/STERLING DRIVER FRONT HYD. CYLINDER ASSY.

SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| F | 2/17/12 | 818235 WAS 240123 | JTM | |
| E | 7/16/11 | ADDED ITEM 13, ADDED TORQUE SPEC | NEH | |
| D | 5/16/11 | CLARIFIED COMPONENT ORDER | NEH | |
| C | 4/21/11 | ADDED SEAL KIT NOTE | NEH | |
| B | 3/17/11 | COMPLETED DRAWING, CORRECTED ORIENTATION | NEH | |
| A | 11/19/10 | REDRAWN IN SOLIDWORKS | BJF | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

RW-1019

TITLE: RW-1019 FRONT HYDRAULIC CYLINDER ASSEMBLY, DRIVER'S SIDE

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| MSM | | 10/13/94 | 240800 | F |

## DMF P/N 240125 - SEAL KIT
## (SEAL KIT INCLUDES ITEM #'s 4,5,6,7,8 & 9)

**TO DETERMINE DRIVER SIDE VS. PASSENGER SIDE**

DUE TO WEIGHT OF CYLINDERS, PLACE CYLINDER ON THE FLOOR OR TABLE FIRST. THEN POSITION THE CYLINDER (WITH FITTINGS POINTED TOWARDS YOU) AS IF YOU WERE HOLDING THE BASE END IN YOUR LEFT HAND AND THE ROD END IN YOUR RIGHT HAND. WITH IT POSITIONED AS SUCH, LOOKING AT THE ACTUAL FITTING ON THE BASE END:

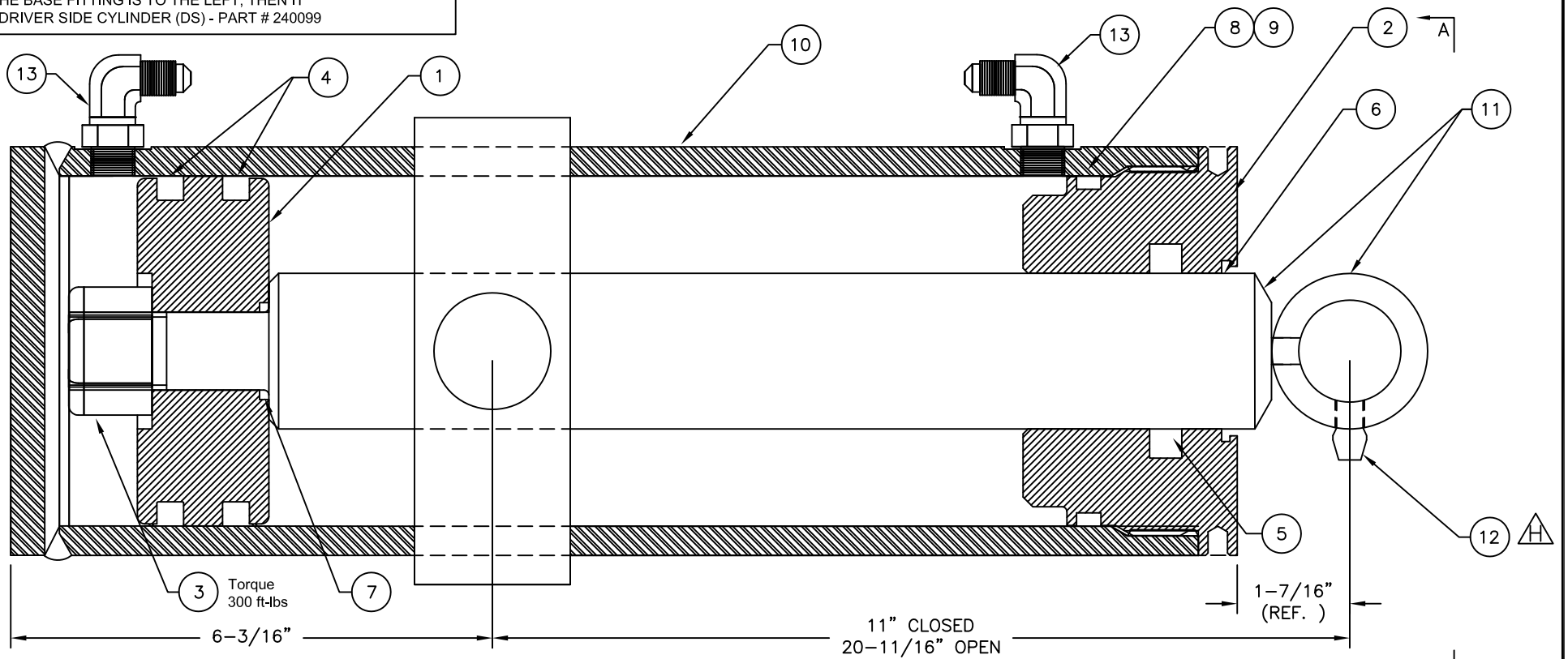
*IF THE BASE FITTING IS TO THE RIGHT, THEN IT IS A PASSENGER SIDE CYLINDER (PS) - PART # 240100

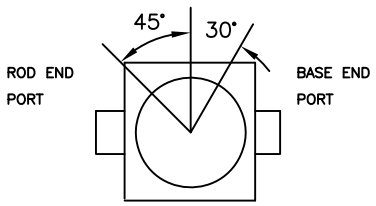
⚠

*IF THE BASE FITTING IS TO THE LEFT, THEN IT IS A DRIVER SIDE CYLINDER (DS) - PART # 240099

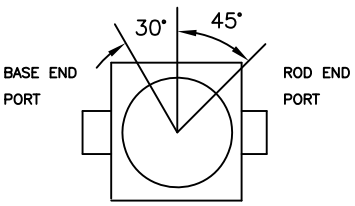
**SEE PP008 FOR CYLINDER ASS'Y & TEST PROCEDURE**

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 240101 | 1 | PISTON: 4–1/2" |
| 2 | 240102 | 1 | GLAND: 4–1/2" |
| 3 | 240103 | 1 | NUT, NYLOCK: 1"–14 |
| 4 | 240104 | 2 | SEAL, PISTON: 3120–3875 |
| 5 | 240105 | 1 | SEAL, ROD: 3750–2000 |
| 6 | 240106 | 1 | WIPER, ROD: 959–21 |
| 7 | 240107 | 1 | O–RING, PISTON: 2–214 |
| 8 | 240108 | 1 | O–RING, GLAND: 2–346 |
| 9 | 240109 | 1 | O–RING, GLAND BACK–UP: 8–346 |
| 10 | 240110 | 1 or | BARREL ASSEMBLY: 4–1/2" (DRIVER'S SIDE) |
|  | 240115 | 1 | BARREL ASSEMBLY: 4–1/2" (PASSENGER'S SIDE) |
| 11 | 240120 | 1 | ROD ASSEMBLY: 2" |
| ⚠H 12 | 818235 | 1 | GREASE FITTING: 1/8" NPT |
| 13 | 241006 | 2 | FITTING, ELBOW: 1/4"JIC x 9/16"–18; 6801–NW–4–6 |




DETAIL A–A
P/N 240100
PASSENGER'S SIDE




DETAIL A–A
P/N 240099
DRIVER'S SIDE

# ⚠6 1630/1420/1212/1019 FRONT CYLINDER

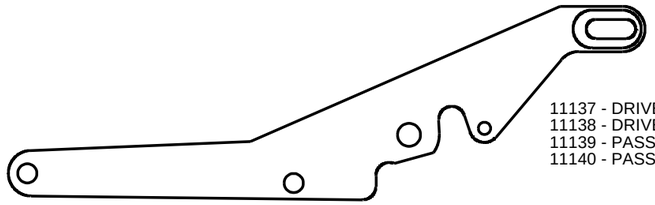
| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| ⚠ |  |  |  |  |
| ⚠ | 7/25/13 | SWAPPED PASSENGER/DRIVER SIDE | JDI |  |
| ⚠H | 2/17/12 | 818235 WAS 240123 | JTM |  |

| TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX OR .XXXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |
| BREAK SHARP EDGES ( 0.030 x 45° MAX ) | |

TITLE: RW–1630 FRONT HYDRAULIC CYLINDER ASSEMBLY (4–1/2"BORE x 2"ROD x 9–11/16"STROKE)

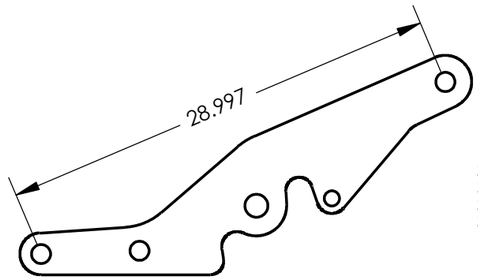
DIVERSIFIED METAL FABRICATORS,INC.(404)875–1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| TSH |  | 11/10/92 | 240099 DS/ 240100 PS | I |



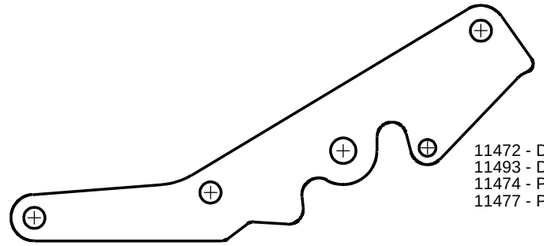
11137 - DRIVER SIDE OUTER
11138 - DRIVER SIDE INNER
11139 - PASSENGER SIDE OUTER
11140 - PASSENGER SIDE INNER

**1019 LONG ARM DETAIL, PRE-'02 GM/CHEVY 3500 HD** C



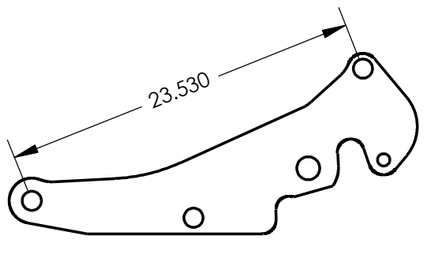

11441 - DRIVER SIDE OUTER
11442 - DRIVER SIDE INNER
11443 - PASSENGER SIDE OUTER
11444 - PASSENGER SIDE INNER

**1019 LONG ARM, '06 F4/550**



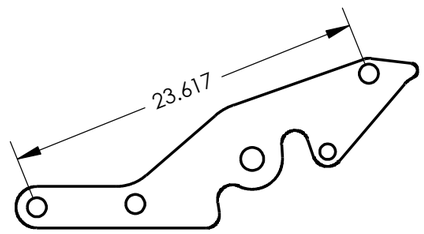
11472 - DRIVER SIDE OUTER
11493 - DRIVER SIDE INNER
11474 - PASSENGER SIDE OUTER
11477 - PASSENGER SIDE INNER

**1019 LONG ARM, '08 DODGE/STERLING 45/5500** A



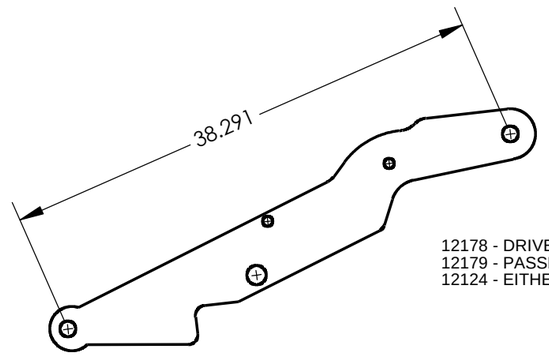

11310 - DRIVER SIDE OUTER
11312 - PASSENGER SIDE OUTER

**1019 SUPER-DUTY OUTER LONG ARM, '98 TO '04**



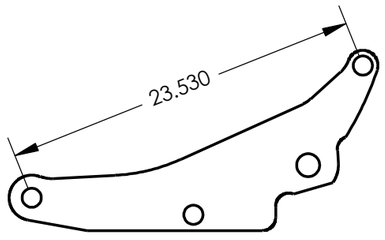

11445 - DRIVER SIDE OUTER
11446 - DRIVER SIDE INNER
11447 - PASSENGER SIDE OUTER
11448 - PASSENGER SIDE INNER

**1019 LONG ARM, '08 F4/550**



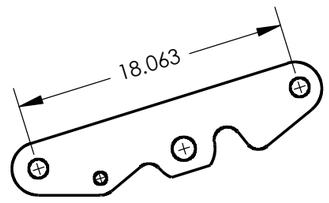

12178 - DRIVER SIDE INNER
12179 - PASSENGER SIDE INNER
12124 - EITHER OUTER

C **1019 LONG ARM, '02-'09 GM/CHEVY 45/5500**




11314 - DRIVER SIDE INNER
11316 - PASSENGER SIDE INNER

**1019 SUPER-DUTY INNER LONG ARM, '98 TO '04**




10098 - DRIVER SIDE OUTER
10099 - PASSENGER SIDE OUTER
10121 - PASSENGER SIDE INNER
10122 - DRIVER SIDE INNER

**1019 SUPER-DUTY INNER LONG ARM, PRE-'98** A

NOTE: GIVEN PART #'S HAVE VARYING RETENTION OPTIONS.
WHEN ORDERING PARTS, PLEASE INFORM THE DMF PARTS DEPARTMENT OF WHAT STYLE OF LONG ARM AND RETENTION OPTIONS YOU REQUIRE.
REFER TO DRAWING M1019124 FOR MORE INFORMATION.

**NOTE:**
IF ORDERING DRIVER'S SIDE OUTER ARM, MUST HAVE SERIAL # FOR A REPLACEMENT SERIAL TAG. (LONG ARM WILL SHIP WITH TAG ATTACHED)

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | 5/27/11 | ADDED GM/CHEVY LONG ARM, ADDED YEAR MODEL | NEH | |
| B | 5/3/11 | ADDED RETENTION NOTE | NEH | |
| A | 4/18/11 | ADDED DODGE/STERLING LONG ARM, ADDED YEAR MODEL | NEH | |

| TOLERANCES: (UNLESS SPECIFIED) | |
|---|---|
| FRAC., MACH: | ± 1/32" |
| FRAC., OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | ± .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES (1/32R X 45° MAX.)

RW-1019

TITLE: RW-1019 VARIOUS LONG ARMS

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

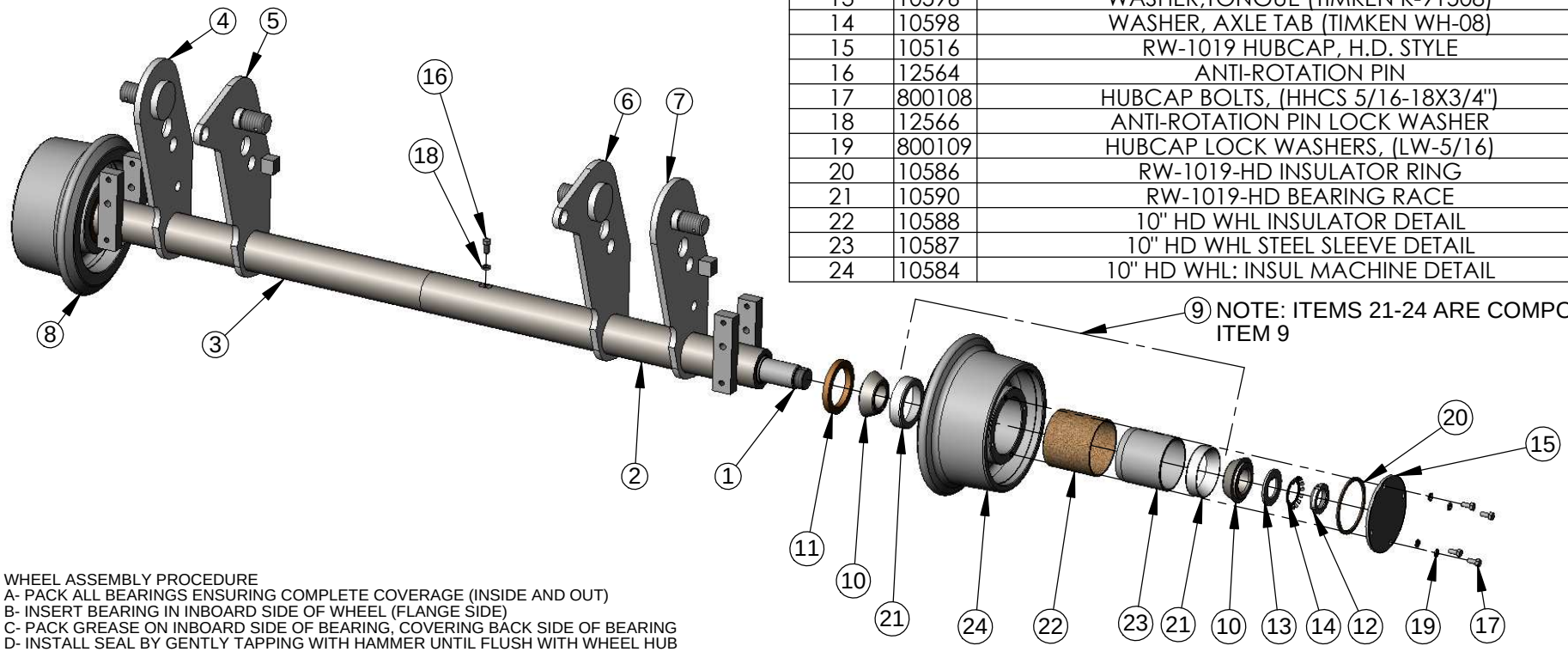
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| JBG | | 4/22/10 | M1019116 | C |

# PARTS: (MUST HAVE SERIAL # WHEN ORDERING)

COMOPLETE FRONT AXLE ASSEMBLY OPTIONS (AXLE, AXLE TUBES, WHEELS, AND PIVOT ARMS)
('05-CURRENT F-4/550, '08-CURRENT DODGE/STERLING 45/5500 ONLY)
NON-INSULATED, WITH BRAKES - 11676
NON-INSULATED, NO BRAKES - 11678
INSULATED, WITH BRAKES - 11668
INSULATED, NO BRAKES - 11662

FRONT AXLE TUBE OPTIONS:
DRIVER'S SIDE, W/BRAKE SADDLES: 10660
PASSENGER'S SIDE, W/BRAKE SADDLES: 10658
DRIVER'S SIDE, NO BRAKE SADDLES: 10662
PASSENGER'S SIDE, NO BRAKE SADDLES: 10664

| ITEM NO. | PART # | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 10603 | RW-1019-HD AXLE | 1 |
| 2 | 10660 | RW-1019-HD AXLE TUBE ASSY., FRONTLH | 1 |
| 3 | 10658 | RW-1019-HD AXLE TUBE ASSY., FRONT RH | 1 |
| 4 | 11111 | RW-1019 PIVOT ARM ASS'Y, FRONT PASSENGER OUTBOARD | 1 |
| 5 | 11105 | RW-1019 PIVOT ARM ASS'Y, FRONT PASSENGER INBOARD | 1 |
| 6 | 11104 | RW-1019 PIVOT ARM ASS'Y, FRONT DRIVER INBOARD | 1 |
| 7 | 11110 | RW-1019 PIVOT ARM ASS'Y, FRONT DRIVER OUTBOARD | 1 |
| 8 | 10570 | RW-1019-HD WHEEL,NON-INS., W/RACES | 1 |
| 9 | 10580 | RW-1019-HD WHEEL,INSULATED,w/RACES | 1 |
| 10 | 10591 | RW-1019-HD BEARING CONE | 4 |
| 11 | 10592 | RW-1019-HD SEAL, STANDARD | 2 |
| 12 | 10595 | NUT, AXLE (TIMKEN TN-08) | 2 |
| 13 | 10596 | WASHER,TONGUE (TIMKEN K-91508) | 2 |
| 14 | 10598 | WASHER, AXLE TAB (TIMKEN WH-08) | 2 |
| 15 | 10516 | RW-1019 HUBCAP, H.D. STYLE | 2 |
| 16 | 12564 | ANTI-ROTATION PIN | 1 |
| 17 | 800108 | HUBCAP BOLTS, (HHCS 5/16-18X3/4") | 8 |
| 18 | 12566 | ANTI-ROTATION PIN LOCK WASHER | 1 |
| 19 | 800109 | HUBCAP LOCK WASHERS, (LW-5/16) | 8 |
| 20 | 10586 | RW-1019-HD INSULATOR RING | 1 |
| 21 | 10590 | RW-1019-HD BEARING RACE | - |
| 22 | 10588 | 10" HD WHL INSULATOR DETAIL | - |
| 23 | 10587 | 10" HD WHL STEEL SLEEVE DETAIL | - |
| 24 | 10584 | 10" HD WHL: INSUL MACHINE DETAIL | - |




WHEEL ASSEMBLY PROCEDURE
A- PACK ALL BEARINGS ENSURING COMPLETE COVERAGE (INSIDE AND OUT)
B- INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE)
C- PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING
D- INSTALL SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB
E- PLACE WHEEL ON AXLE
F- FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE
G- INSERT BEARING IN OUTBOARD SIDE OF WHEEL
H- INSTALL AXLE WASHERS ALIGNING THEM WITH KEYWAY (ITEMS 12 AND 13)
I- INSTALL AXLE NUT (ITEM 14)
J- ADJUST BEARING
  1- TIGHTEN WHEEL HEAVILY BY HAND (25-50 LB/FT)
  2- ROTATE WHEEL ONE FULL TURN IN BOTH DIRECTIONS TO SEAT BEARING
  3- BACK OFF NUT (ITEM 14) APPROXIMATELY 1/8 TO 1/4 TURN TO CREATE SLIGHT ENDPLAY
  4- WITH ONE HAND, FIRMLY GRAB WHEEL & ROTATE
  5- WHECK WHEEL ADJUSTMENT WITH A DIAL INDICATOR (IF AVAILABLE) OR FOLLOW THE GUIDELINES BELOW
    a- WHEEL SHOULD SPIN FREELY FOR AT LEAST 1/2 A TURN IF ROTATED HEAVILY BY HAND
    b- NO SIGNIFICANT ENDPLAY SHOULD BE FELT WHEN ROCKING THE WHEEL IN AND OUT
K- SELECT TABS ON AXLE WASHER THAT MOST NEARLY LINE UP WITH THE SLOTS IN THE AXLE NUT AND BEND THEM UP TO SECURE THE NUT
L- FILL OUTBOARD CAVITY WITH GREASE
M- RUN A BEAD OF SILICONE ON HUBCAP MOUNTING SURFACE (OUTBOARD FACE OF HUB)
N- INSTALL HUBCAP WITH PROVIDED HEX SCREWS

# FORD/DODGE/STER. FRONT WHEEL & AXLE ASSY. PARTS DIAGRAM

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 7/5/11 | UPDATED TO SHOW INSULATED ASSEMBLY | NEH | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

-

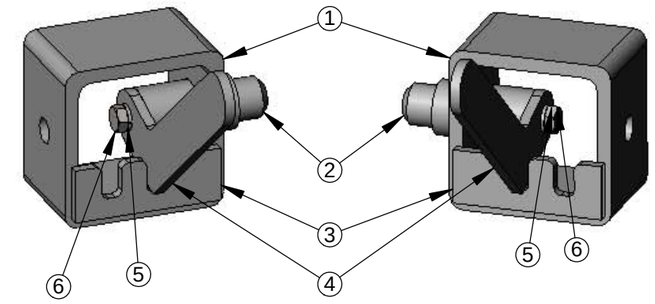
TITLE: FRONT WHEEL & AXLE ASSY PARTS DIAGRAM, '08 F-550, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/19/11 | M1019112 | A |

LEVER PIN-OFF
DRIVER SIDE: 818890

PASSENGER SIDE: 818891

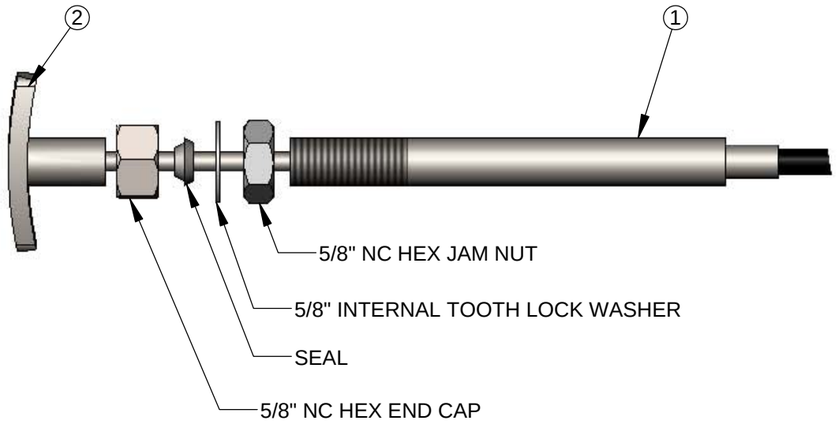


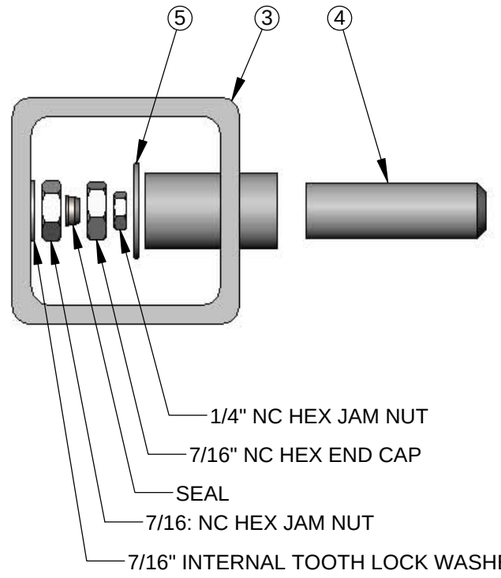

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 818785 | 1 | REMOTE PINOFF WELDMENT |
| 2 | 818766 | 1 | RW-1630 CABLE REMOTE PINOFF PIN DETAIL, FRONT |
| 3 | 818893 | 1 | STOP BAR, 1019 LEVER PINOFF |
| 4 | 818892 | 1 | LEVER DETAIL, 1019 LEVER PINOFF |
| 5 | 82654 | 1 | 1/4" LOCK WASHER |
| 6 | 11255 | 1 | HHCS 1/4-20 UNC X 3/4" LONG |

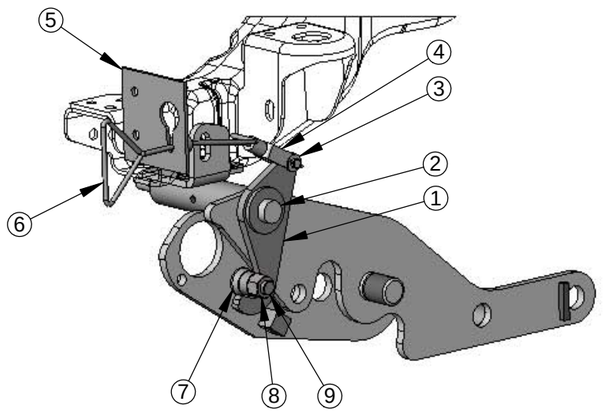
LEVER PIN-OFF RETENTION SYSTEM
STANDARD ON FORD/DODGE/STERLING
FOR RETRO-FIT OPTIONS CONTACT DMF

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 818577 | 1 | REM.P/O CABLE ASSY.,41"w/HANDLE |
| 2 | 818571 | 1 | REM.P/O PLASTIC TEE HANDLE (MORSE) |
| 3 | 818785 | 1 | REMOTE PINOFF WELDMENT |
| 4 | 818766 | 1 | REM.P/O PIN, FRONT (CABLE)(RW-1019)2-3/8" |
| 5 | 818767 | 1 | 1019 PIN OFF STOP WASHER |

CABLE REMOTE PIN-OFF RETENTION SYSTEM
AVAILABLE ACROSS PRODUCT LINE
FOR RETRO-FIT OPTIONS CONTACT DMF

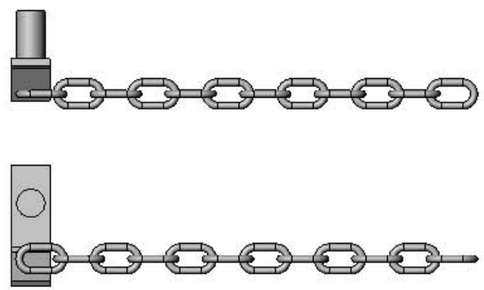





HOOK LOCK RETENTION SYSTEM
CURRENTLY AVAILABLE FOR '08 FORD F-4/550'S ONLY
FOR RETRO-FIT OPTIONS OR POSSIBLE OPTIONS
FOR OTHER CHASSIS CONTACT DMF

| ITEM | PART # | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 818853 | 1 | HOOK LOCK, 1019, FRONT - DETAIL |
| 2 | 818858 | 1 | HOOK LOCK PIN WELDMENT |
| 3 | FW3/4 | 2 | 3/4" FLAT WASHER, GRADE 8 |
| 4 | 818854 | 1 | CLEVIS, 9/16" THROAT, 1/2" PIN |
| 5 | 818859 | 1 | KEYHOLE PLATE |
| 6 | 818861 | 1 | PULL ROD WELDMENT, LH |
| | 818864 | - | PULL ROD WELDMENT, RH |
| 7 | 818855 | 1 | LATCH PIN, BOLT ON - HOOK LOCK |
| 8 | 241103 | 1 | 3/4-16 NF LOCKNUT |
| 9 | 818851 | 1 | 3/4-16 X 2-3/4" LONG HEX HEAD CAP SCREW |



PART #: 10168

MANUAL PIN-OFF RETENTION SYSTEM
AVAILABLE ON GM/CHEVY ONLY
FOR RETRO-FIT OPTIONS CONTACT DMF

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.005 R" MAX.)

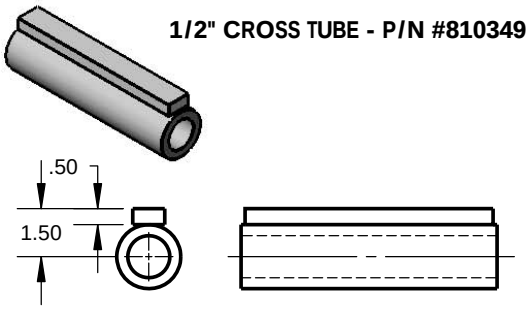
-

TITLE: MANUAL, FRONT RETENTION OPTIONS, RW-1019

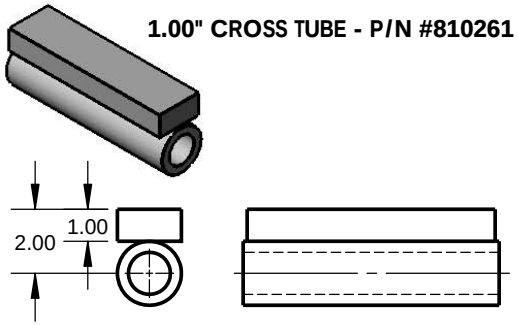
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 5/2/11 | M1019124 | # |

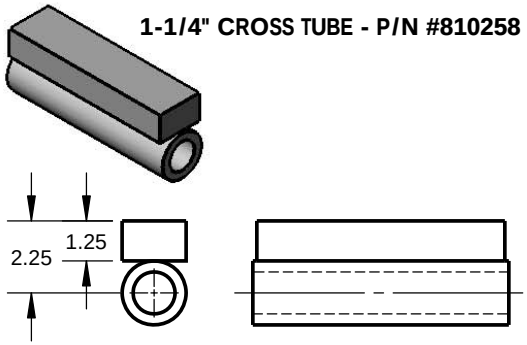
## 1/2" CROSS TUBE - P/N #810349



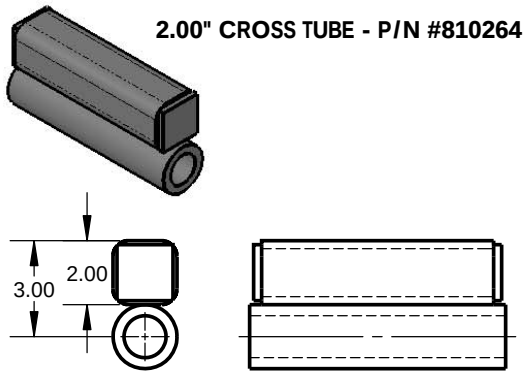

## 1.00" CROSS TUBE - P/N #810261



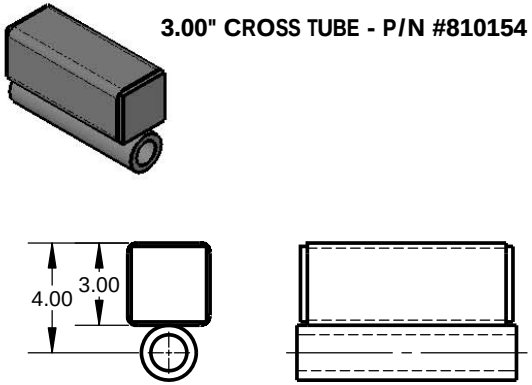

## 1-1/4" CROSS TUBE - P/N #810258



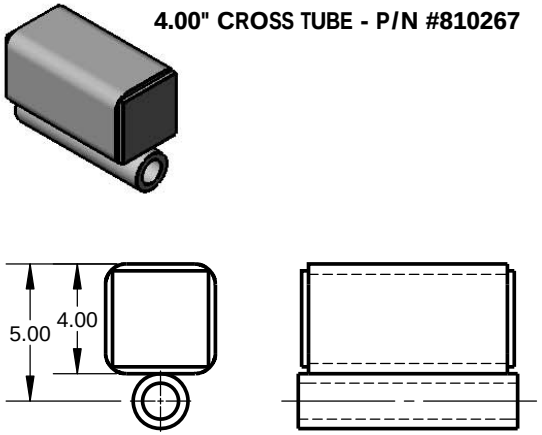

## 2.00" CROSS TUBE - P/N #810264



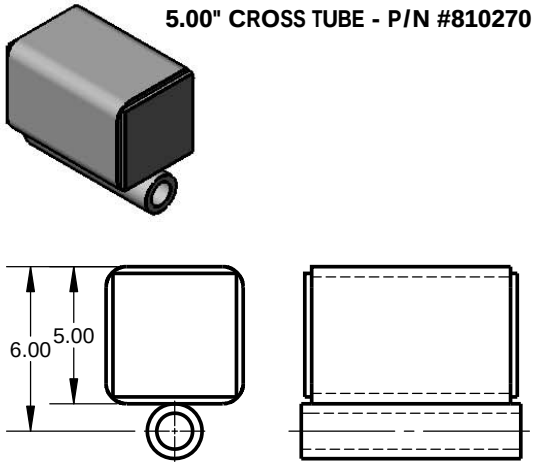

## 3.00" CROSS TUBE - P/N #810154



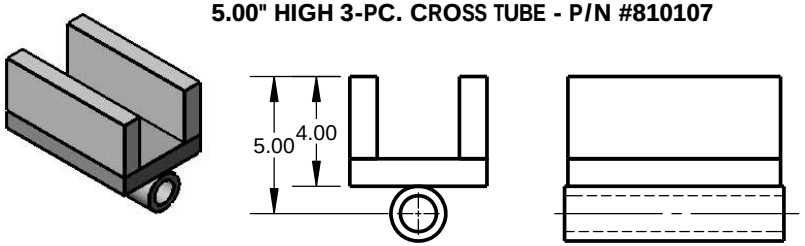

## 4.00" CROSS TUBE - P/N #810267



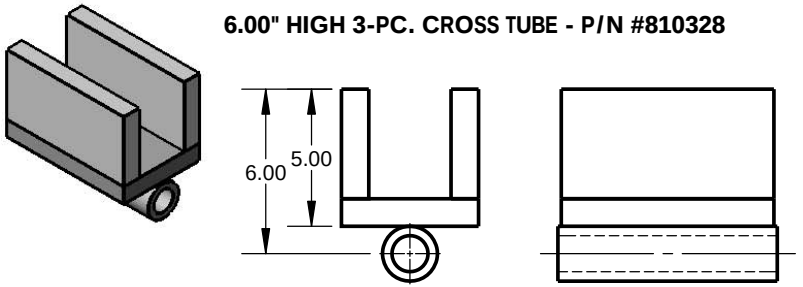

## 5.00" CROSS TUBE - P/N #810270



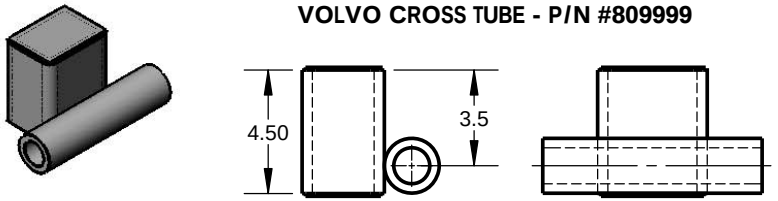

## 5.00" HIGH 3-PC. CROSS TUBE - P/N #810107



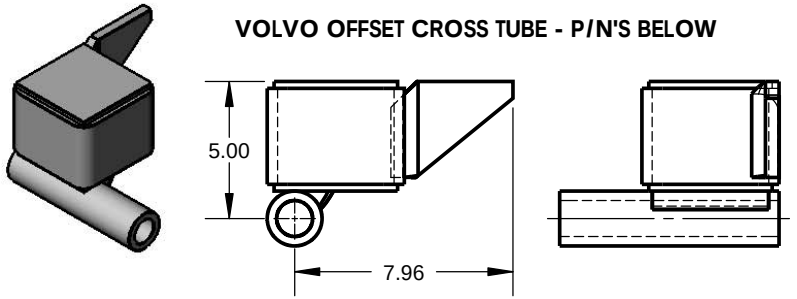

## 6.00" HIGH 3-PC. CROSS TUBE - P/N #810328




## VOLVO CROSS TUBE - P/N #809999




## VOLVO OFFSET CROSS TUBE - P/N'S BELOW




**DRIVER SIDE (SHOWN) - P/N #810388**
**PASSENGER SIDE (OPPOSITE HAND) - P/N #810389**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | - | - | - | |
| A | - | - | - | |

| TOLERANCES: (UNLESS SPECIFIED) | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES ( 0.030 X 45° MAX )

| - | DRAWN BY: JBG | APPD BY: | DATE: 8/11/2010 | DRAWING NUMBER: MGENN101 | REV: # |
|---|---|---|---|---|---|

TITLE: VARIOUS CROSS TUBE DETAILS

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

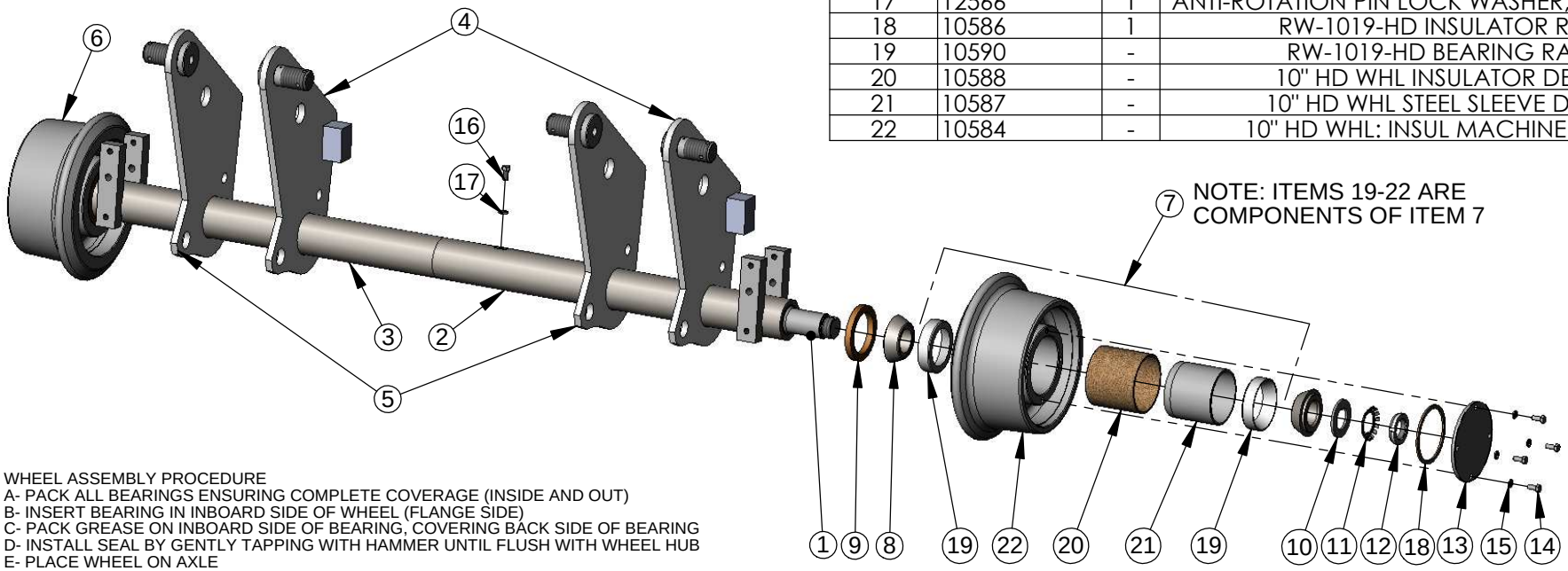
## PARTS: (MUST HAVE SERIAL # WHEN ORDERING)

COMPLETE FRONT AXLE ASSEMBLY OPTIONS (AXLE, AXLE TUBE, WHEELS, AND PIVOT ARMS) ('08-CURRENT C4/5500 ONLY)
NON-INSULATED, WITH BRAKES - 11680
NON-INSULATED, NO BRAKES - 11679
INSULATED, WITH BRAKES - 11663
INSULATED, NO BRAKES - 11667

FRONT AXLE TUBE OPTIONS:
DRIVER'S SIDE, W/ BRAKE SADDLES: 10660
PASSENGER'S SIDE, W/ BRAKE SADDLES: 10658
DRIVER'S SIDE, NO BRAKE SADDLES: 10662
PASSENGER'S SIDE, NO BRAKE SADDLES: 10664

1019 WHEEL (W/RACES) OPTIONS:
INSULATED: 10580
NON-INSULATED: 10570

| ITEM NO. | PART NUMBER | QTY. | DESCRIPTION |
|---|---|---|---|
| 1 | 10603 | 1 | RW-1019-HD AXLE |
| 2 | 10660 | 1 | RW-1019-HD AXLE TUBE ASSY., FRONTLH |
| 3 | 10658 | 1 | RW-1019-HD AXLE TUBE ASSY., FRONT RH |
| 4 | 12108 | 2 | 1212 PIVOT ARM ASSY. FOR 1019 TUBE, LH |
| 5 | 12109 | 2 | 1212 PIVOT ARM ASSY. FOR 1019 TUBE, RH |
| 6 | 10570 | 1 | RW-1019-HD WHEEL,NON-INS., W/RACES |
| 7 | 10580 | 1 | RW-1019-HD WHEEL,INSULATED,w/RACES |
| 8 | 10591 | 4 | RW-1019-HD BEARING CONE |
| 9 | 10592 | 2 | RW-1019-HD SEAL, STANDARD |
| 10 | 10596 | 2 | WASHER,TONGUE (TIMKEN K-91508) |
| 11 | 10598 | 2 | WASHER, AXLE TAB (TIMKEN WH-08) |
| 12 | 10595 | 2 | NUT, AXLE (TIMKEN TN-08) |
| 13 | 10516 | 2 | RW-1019 HUBCAP, H.D. STYLE |
| 14 | 800108 | 8 | HUBCAP BOLTS (HHCS 5/16"-18 X 3/4") |
| 15 | 800109 | 8 | HUBCAP LOCK WASHERS, (LW-5/16) |
| 16 | 12564 | 1 | ANTI-ROTATION PIN |
| 17 | 12566 | 1 | ANTI-ROTATION PIN LOCK WASHER, (LW-3/8GR8) |
| 18 | 10586 | 1 | RW-1019-HD INSULATOR RING |
| 19 | 10590 | - | RW-1019-HD BEARING RACE |
| 20 | 10588 | - | 10" HD WHL INSULATOR DETAIL |
| 21 | 10587 | - | 10" HD WHL STEEL SLEEVE DETAIL |
| 22 | 10584 | - | 10" HD WHL: INSUL MACHINE DETAIL |




WHEEL ASSEMBLY PROCEDURE
A- PACK ALL BEARINGS ENSURING COMPLETE COVERAGE (INSIDE AND OUT)
B- INSERT BEARING IN INBOARD SIDE OF WHEEL (FLANGE SIDE)
C- PACK GREASE ON INBOARD SIDE OF BEARING, COVERING BACK SIDE OF BEARING
D- INSTALL SEAL BY GENTLY TAPPING WITH HAMMER UNTIL FLUSH WITH WHEEL HUB
E- PLACE WHEEL ON AXLE
F- FILL CAVITY BETWEEN BEARINGS AND AROUND AXLE UNTIL FLUSH WITH OUTBOARD RACE
G- INSERT BEARING IN OUTBOARD SIDE OF WHEEL
H- INSTALL AXLE WASHERS ALIGNING THEM WITH KEYWAY (ITEMS 12 AND 13)
I- INSTALL AXLE NUT (ITEM 14)
J- ADJUST BEARING
1- TIGHTEN WHEEL HEAVILY BY HAND (25-50 LB/FT)
2- ROTATE WHEEL ONE FULL TURN IN BOTH DIRECTIONS TO SEAT BEARING
3- BACK OFF NUT (ITEM 14) APPROXIMATELY 1/8 TO 1/4 TURN TO CREATE SLIGHT ENDPLAY
4- WITH ONE HAND, FIRMLY GRAB WHEEL & ROTATE
5- WHECK WHEEL ADJUSTMENT WITH A DIAL INDICATOR (IF AVAILABLE) OR FOLLOW THE GUIDELINES BELOW
a- WHEEL SHOULD SPIN FREELY FOR AT LEAST 1/2 A TURN IF ROTATED HEAVILY BY HAND
b- NO SIGNIFICANT ENDPLAY SHOULD BE FELT WHEN ROCKING THE WHEEL IN AND OUT
K- SELECT TABS ON AXLE WASHER THAT MOST NEARLY LINE UP WITH THE SLOTS IN THE AXLE NUT AND BEND THEM UP TO SECURE THE NUT
L- FILL OUTBOARD CAVITY WITH GREASE
M- RUN A BEAD OF SILICONE ON HUBCAP MOUNTING SURFACE (OUTBOARD FACE OF HUB)
N- INSTALL HUBCAP WITH PROVIDED HEX SCREWS

# GM/CHEVY 45/5500 FRONT WHEEL & AXLE ASSY. PARTS DIAGRAM

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 7/5/11 | UPDATED TO SHOW INSULATED ASSEMBLY | NEH | |

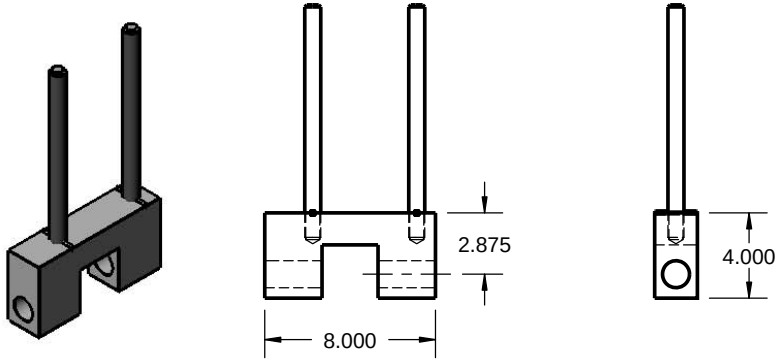
TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: + .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (0.030 X 45° MAX.)

-

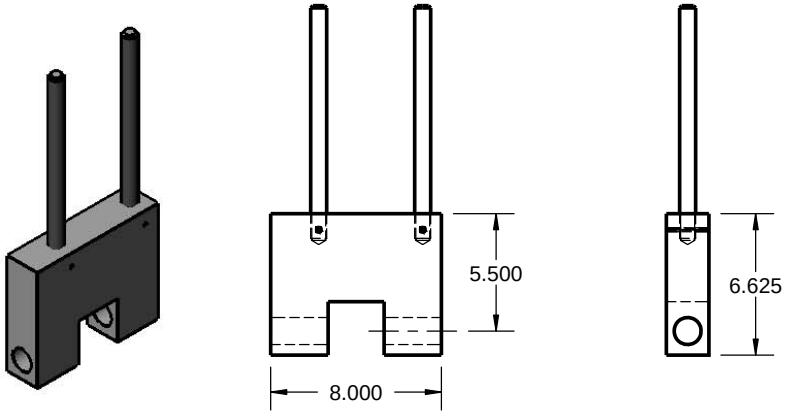
TITLE: FRONT WHEEL & AXLE ASSY PARTS DIAGRAM, '08 C4/5500, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

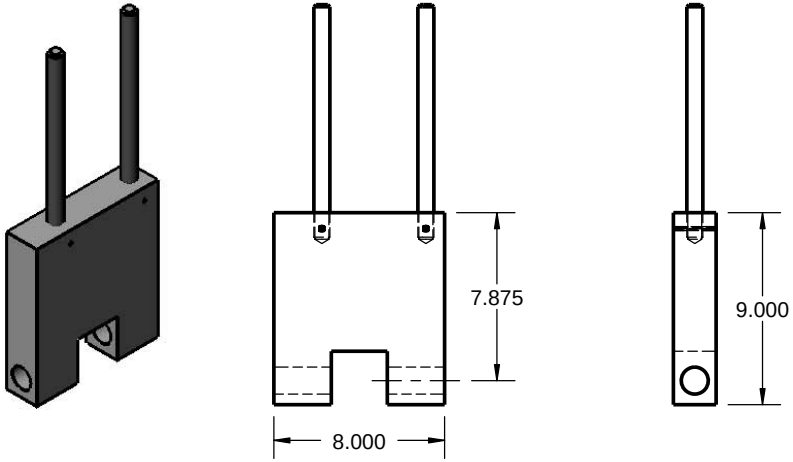
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/19/11 | M1019114 | A |



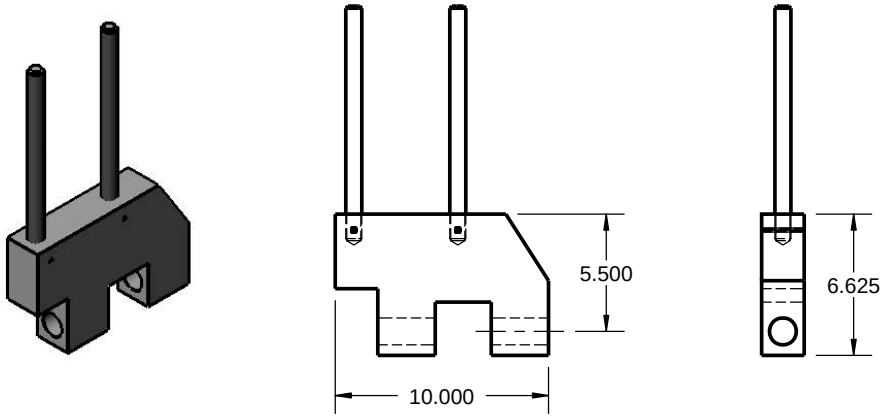

**4" SPRING HANGER - P/N #818155**



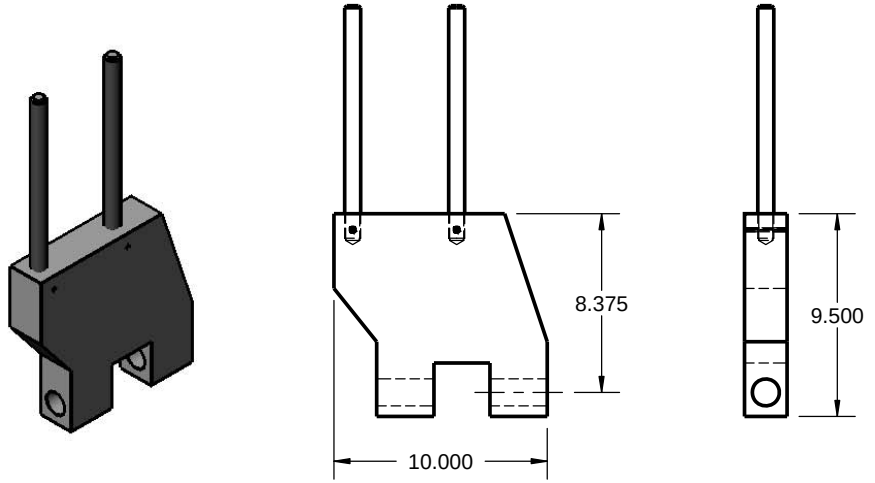

**6-5/8" SPRING HANGER - P/N #818170**




**9" SPRING HANGER - P/N #818142**




**6-5/8" OFFSET SPRING HANGER - P/N #818172**




**9-1/2" OFFSET SPRING HANGER - P/N #810136**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | + .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES ( 0.030 X 45° MAX )

-

DRAWN BY: JBG

APPD BY:

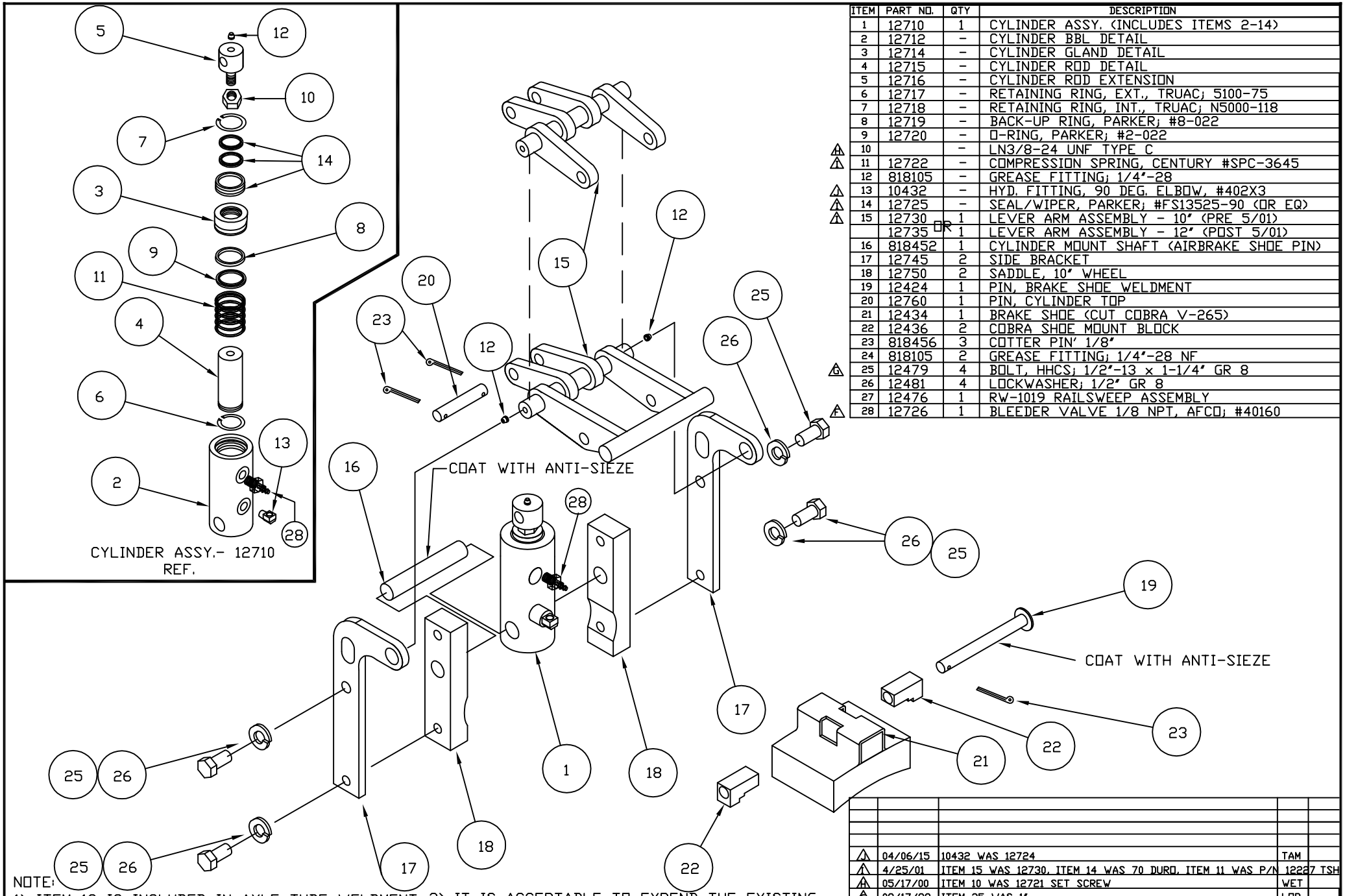
TITLE: VARIOUS SPRING HANGER BRACKETS

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 4/01/10

DRAWING NUMBER: MGENN100

REV: #




| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | 12710 | 1 | CYLINDER ASSY. (INCLUDES ITEMS 2-14) |
| 2 | 12712 | - | CYLINDER BBL DETAIL |
| 3 | 12714 | - | CYLINDER GLAND DETAIL |
| 4 | 12715 | - | CYLINDER ROD DETAIL |
| 5 | 12716 | - | CYLINDER ROD EXTENSION |
| 6 | 12717 | - | RETAINING RING, EXT., TRUAC; 5100-75 |
| 7 | 12718 | - | RETAINING RING, INT., TRUAC; N5000-118 |
| 8 | 12719 | - | BACK-UP RING, PARKER; #8-022 |
| 9 | 12720 | - | O-RING, PARKER; #2-022 |
| 10 | | - | LN3/8-24 UNF TYPE C |
| 11 | 12722 | - | COMPRESSION SPRING, CENTURY #SPC-3645 |
| 12 | 818105 | - | GREASE FITTING; 1/4"-28 |
| 13 | 10432 | - | HYD. FITTING, 90 DEG. ELBOW, #402X3 |
| 14 | 12725 | - | SEAL/WIPER, PARKER; #FS13525-90 (OR EQ) |
| 15 | 12730 | 1 | LEVER ARM ASSEMBLY - 10" (PRE 5/01) |
| | 12735 OR | 1 | LEVER ARM ASSEMBLY - 12" (POST 5/01) |
| 16 | 818452 | 1 | CYLINDER MOUNT SHAFT (AIRBRAKE SHOE PIN) |
| 17 | 12745 | 2 | SIDE BRACKET |
| 18 | 12750 | 2 | SADDLE, 10" WHEEL |
| 19 | 12424 | 1 | PIN, BRAKE SHOE WELDMENT |
| 20 | 12760 | 1 | PIN, CYLINDER TOP |
| 21 | 12434 | 1 | BRAKE SHOE (CUT COBRA V-265) |
| 22 | 12436 | 2 | COBRA SHOE MOUNT BLOCK |
| 23 | 818456 | 3 | COTTER PIN' 1/8" |
| 24 | 818105 | 2 | GREASE FITTING; 1/4"-28 NF |
| 25 | 12479 | 4 | BOLT, HHCS; 1/2"-13 x 1-1/4" GR 8 |
| 26 | 12481 | 4 | LOCKWASHER; 1/2" GR 8 |
| 27 | 12476 | 1 | RW-1019 RAILSWEEP ASSEMBLY |
| 28 | 12726 | 1 | BLEEDER VALVE 1/8 NPT, AFCO; #40160 |

NOTE:

1) ITEM 18 IS INCLUDED IN AXLE TUBE WELDMENT WELDMENT (2) ARE REQUIRED FOR ASSEMBLY TO EXISTING UNITS.

2) RAILSWEEP ASSEMBLY, ITEM #27, NOT SHOWN.
⚠ RAILSWEEP BRACKET ATTACHES TO SADDLE, ITEM #17, USING ITEMS #25 & #26 MOUNTING HARDWARE.

3) IT IS ACCEPTABLE TO EXPEND THE EXISTING ⚠ STOCK OF ITEM #25 ON THIS ASSEMBLY BEFORE CHANGING BOLT LENGTH.

4) EQUIVALENT SEAL/WIPER:
⚠ SHAMBAN #S48317-00750A-448

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| ⚠ | 04/06/15 | 10432 WAS 12724 | TAM | |
| ⚠ | 4/25/01 | ITEM 15 WAS 12730. ITEM 14 WAS 70 DURO. ITEM 11 WAS P/N 12287 | TSH | |
| ⚠ | 05/17/00 | ITEM 10 WAS 12721 SET SCREW | WET | |
| ⚠ | 09/17/98 | ITEM 25 WAS 1" | LDR | |
| ⚠ | 05/07/98 | ADDED ITEM #28 | KLC | TSH |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC. MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES: ± .005
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES

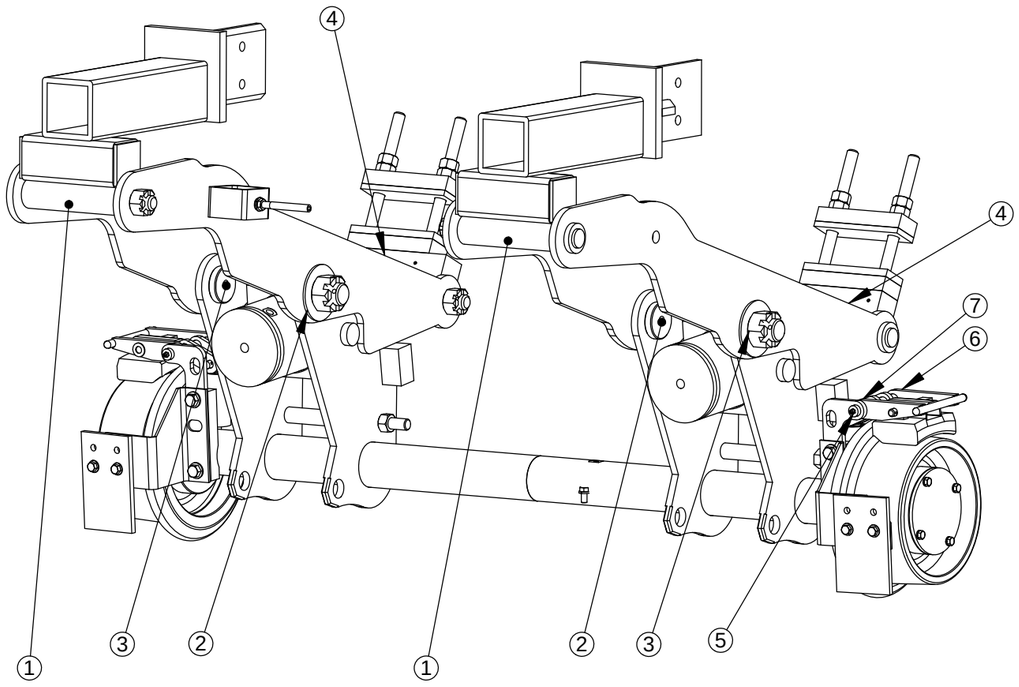
TITLE: ASSEMBLY DETAIL - 10"

DIVERSIFIED METAL FABRICATORS, INC. (404) 875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| MRV | TSH | 11/28/95 | 12700 | J |

| LOCATION | QTY | DESCRIPTION |
|---|---|---|
| 1 | 2 | FRONT CROSSTUBE PIVOT |
| 2 | 2 | MAIN PIVOT - INBOARD |
| 3 | 2 | MAIN PIVOT - OUTBOARD |
| 4 | 2 | SPRING HANGER PIVOT (CYLINDER ROD END) |
| 5 | 2 | BRAKE ARM PIVOT - FRONT |
| 6 | 2 | BRAKE ARM PIVOT - REAR |
| 7 | 2 | BRAKE CYLINDER ROD END |

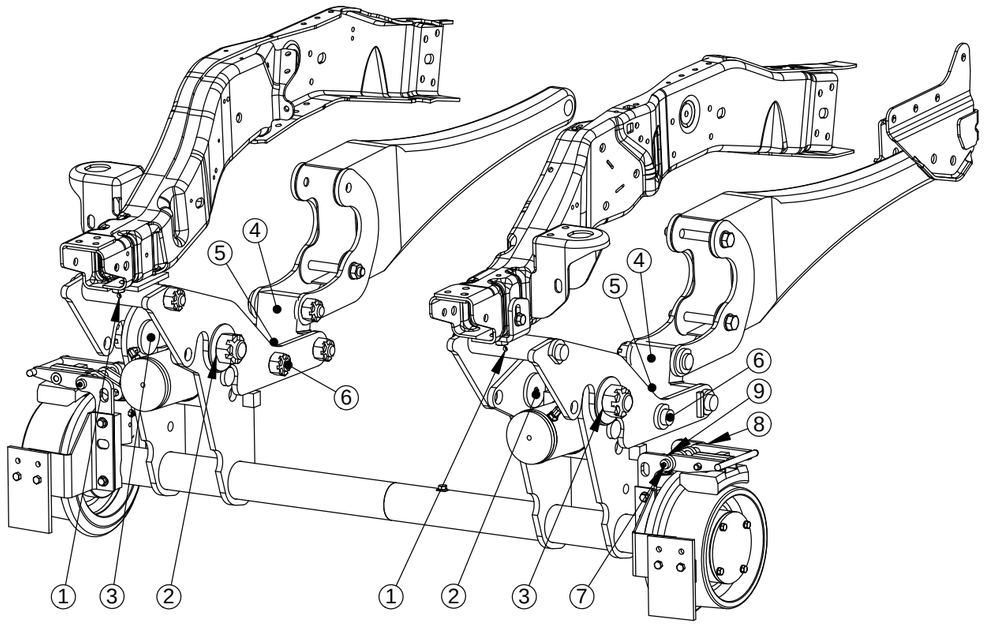
'08 GM/CHEVY C4/5500 FRONT HI-RAIL GEAR




NOTE: MAIN PIVOT GREASE ZERT FITTINGS ARE LOCATED ON THE SIDE ADJACENT TO THE CYLINDER BODY

| LOCATION | QTY. | DESCRIPTION |
|---|---|---|
| 1 | 2 | FRONT CROSS TUBE PIVOT |
| 2 | 2 | MAIN PIVOT - INBOARD |
| 3 | 2 | MAIN PIVOT - OUTBOARD |
| 4 | 2 | SWING BLOCK UPPER PIVOT |
| 5 | 2 | SWING BLOCK LOWER PIVOT |
| 6 | 2 | CYLINDER ROD END PIVOT |
| 7 | 2 | BRAKE ARM PIVOT - FRONT |
| 8 | 2 | BRAKE ARM PIVOT - REAR |
| 9 | 2 | BRAKE CYLINDER END PIVOT |

'08 FORD F-4/550 & DODGE 4/5500 FRONT HI-RAIL GEAR (FORD SHOWN)




NOTE: MAIN PIVOT GREASE ZERT FITTINGS ARE LOCATED ON THE SIDE ADJACENT TO THE CYLINDER BODY

LUBRICATION SPECIFICATION:

- **Factory Standard:** Citgo Syndurance Premium Synthetic 460 #2
- **Warm Climates:** Mystik JT-6 Hi-Temp Multi-Purpose Grease #2 (or equivalent)

*AS A WEEKLY PREVENTITIVE MAINTENANCE PROCEDURE: GREASE ALL LOCATIONS AND CHECK FOR UNUSUAL WEAR

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | 5/20/15 | UPDATED GREASE STANDARDS | JDI | |

| TOLERANCES: (UNLESS SPECIFIED) | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | ± .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES (.010) X 45° MAX.)

-

DRAWN BY: NEH

APPD BY:

TITLE: MANUAL, FRONT GREASE POINT LOCATIONS, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

DATE: 4/21/11

DRAWING NUMBER: M1019117

REV: A

# DMF LIMITED WARRANTY POLICY

**Diversified Metal Fabricators (DMF)** products are designed to provide the utmost service and reliability. Competent workmen, guided by stringent quality standards, manufacture the products from high-grade material. **DMF** warrants products of its manufacture to be free of defects in material and workmanship, under normal use and service, for a period of **ONE CALENDAR YEAR**. **DMF's** obligation under this warranty is limited to repairing or replacing at its factory, or other location designated by us, any part or parts there-of which shall, within 30 DAYS of the date of failure or notice of defect, be returned, and which upon examination shall appear to **DMF's** satisfaction to have been defective. Such repair or replacement does not include the cost of installing the new part or any other expenses incident thereto; however, the outbound direct ground freight on the part will be prepaid to locations within the continental United States and Canada. **DMF** shall not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products.

Ordinary wear and tear, abuse, misuse, neglect, or alteration is not covered by this warranty. **DMF** assumes no liability for expenses or repairs made outside its factory except by written consent. Warranty is null and void if instructions and operating procedures specifically referring to warranty coverage are not followed.

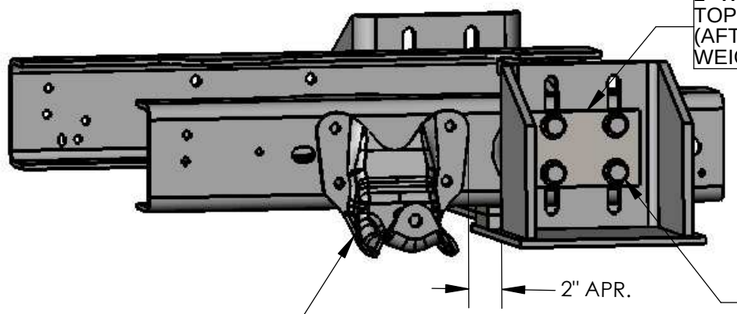
Equipment or parts not manufactured by this company, but which are furnished in connection with **DMF** products are covered directly and solely by the warranty of the manufacturer supplying them.

This warranty is in lieu of other warranties, expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose and any liability for special or consequential damages.

All warranty claims must reference a serial number. Returns must reference a RA number.

DMF ◆ 665 Pylant Street ◆ Atlanta, Georgia 30306
Parts (404) 607-1684◆ Parts Fax (404) 879-7888◆ parts@dmfatlanta.com
Service Department (404) 879-7882◆ service@dmfatlanta.com
Phone (404) 875-1512 ◆ Fax (404) 875-4835◆ info@dmfatlanta.com
http://www.dmfatlanta.com

FOR SPECIFIC PART NUMBERS REFERENCE DRAWING #M1019104

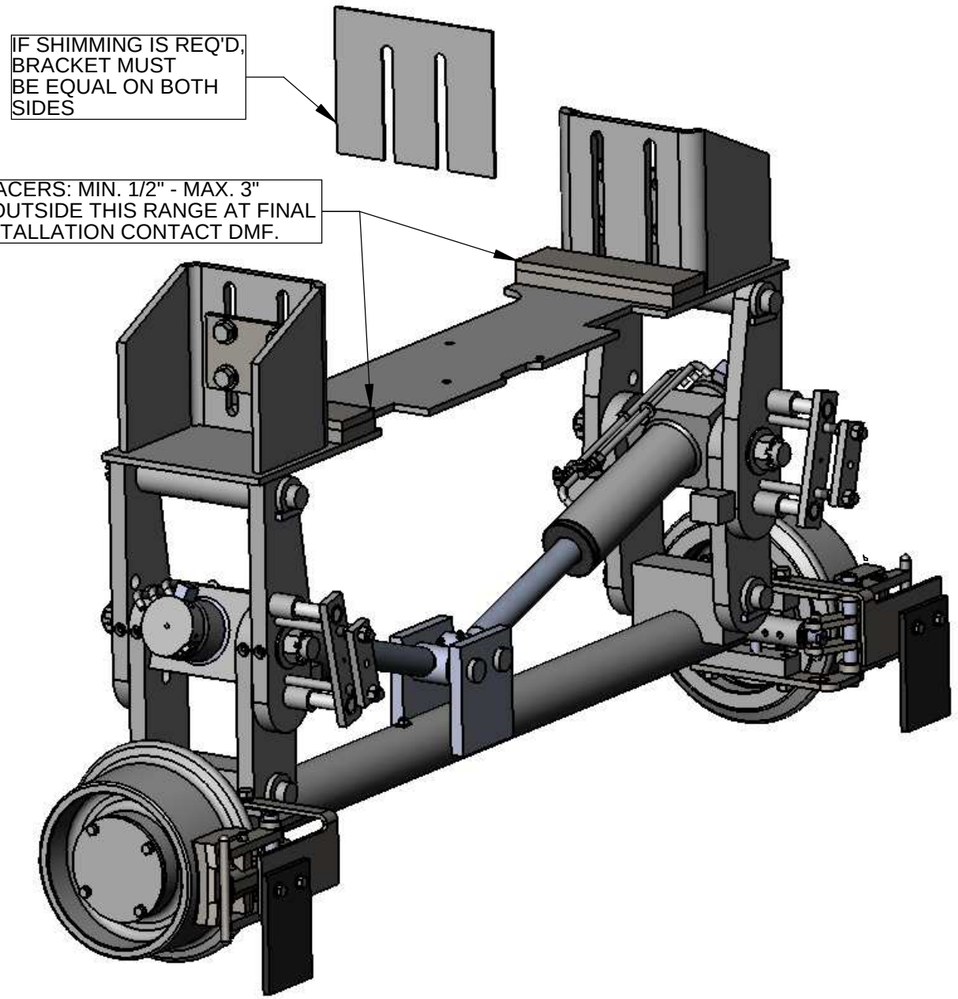


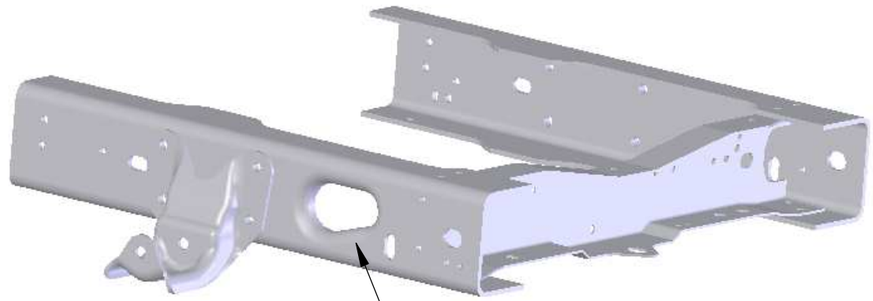

NOTE #1: GRADE 5 BOLTS MUST BE USED WHEN MOUNTING GEAR TO TRUCK FRAME

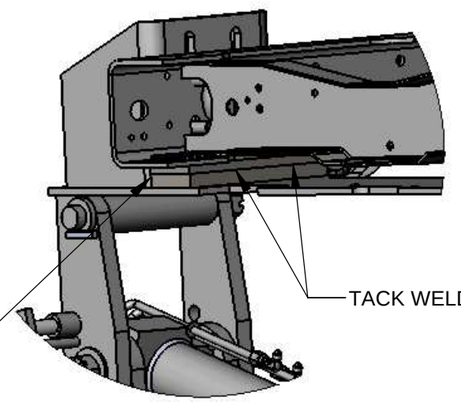
NOTE #2: AT FINAL INSTALLATION:
(AFTER OVERALL FRONT TO BACK RAILGEAR ALIGNMENT & WEIGHT SETTING HAVE BEEN COMPLETED)
FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.

WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS & LEAD TO PREMATURE BEARING FAILURE.

- ENSURE SPACERS ARE PRESSED FULLY AGAINST SIDE BRACKET (OR SHIMS) & ALIGNED WITH THE REAR BRACKET (WELD AS INDICATED IN THE DETAIL ABOVE)
- IF MULTIPLE SPACERS ARE USED, ENSURE THAT THEY ARE WELDED TO ONE ANOTHER (WELD AS INDICATED IN DETAIL ABOVE)
- ENSURE BOLTS ARE TIGHTENED TO TORGUE SPECS: 154 LB-FT
- WELD 4-HOLE MOUNTING PLATE TO REAR BRACKET SIDE PLATE AS SHOWN IN THE DETAIL ABOVE





FORD/DODGE ONLY
PRIOR TO ATTACHING REAR FRAME BRACKET:
TRIM INTERIOR PROTRUSION AT FUEL PASSTHROUGH
AND PATCH HOLE WITH COMPARABLE THICKNESS
MATERIAL.




ENSURE ALL SPACERS ARE FIRMLY AGAINST SIDE BRACKET & ALIGNED WITH THE REAR MOUNTING BRACKET. FULLY WELD SPACER TO MOUNTING BRACKET AS SHOWN (IF MULTIPLE SPACERS ARE USED, SPACERS NEED TO BE WELDED TO ONE ANOTHER AT THE REAR AND TACK WELDED ON THE SIDES)

## APPLIES TO ALL CURRENTLY APPROVED CHASSIS

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.030 X 45° MAX.)

-

TITLE: MANUAL, REAR ASSY INSTALL, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

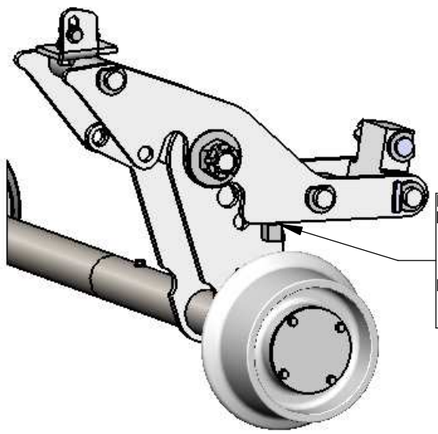
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/7/11 | M1019105 | # |

**FOR INDIVIDUAL PARTS LIST OR PARTS ORDERING, REFER TO DRAWING #M1019101**

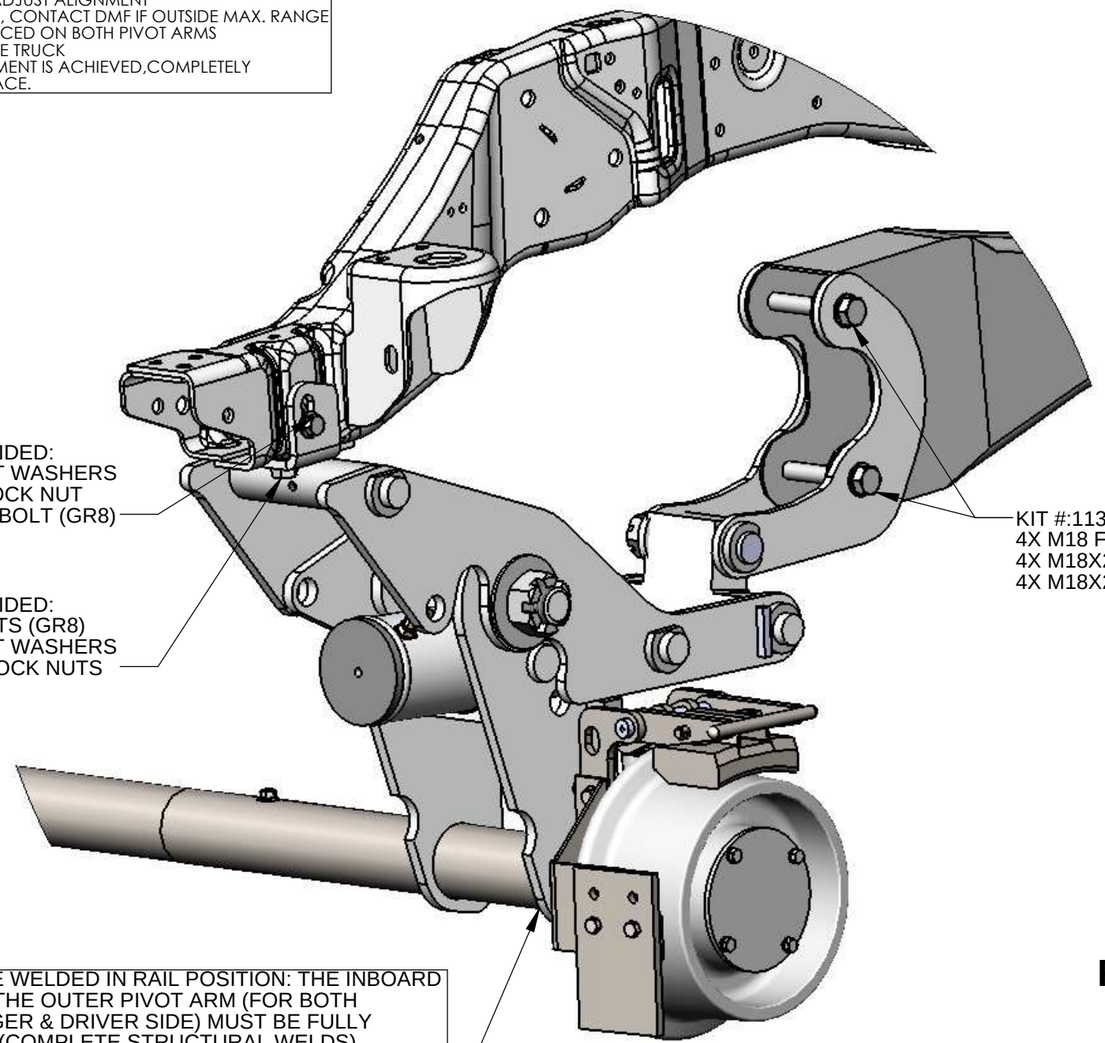
NOTE #1: GRADE 8 BOLTS MUST BE USED WHEN MOUNTING GEAR TO TRUCK FRAME.

NOTE #2: AT FINAL INSTALLATION: (AFTER OVERALL FRONT TO BACK RAILGEAR ALIGNMENT & WEIGHT SETTING HAVE BEEN COMPLETED) FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.

WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS LEAD TO PRE-MATURE BEARING FAILURE



**RAILGEAR ALIGNMENT ADJUSTMENT:**
IF SLIGHT ADJUSTMENTS NEEDED:
- ADD SHIM STOCK TO ADJUST ALIGNMENT
- 1/4" MAX. ALLOWABLE, CONTACT DMF IF OUTSIDE MAX. RANGE
- SHIMS SHOULD BE PLACED ON BOTH PIVOT ARMS FOR A GIVEN SIDE OF THE TRUCK
- ONCE PROPER ALIGNMENT IS ACHIEVED,COMPLETELY WELD ALL SHIMS IN PLACE.



NOT PROVIDED:
1/2-13 FLAT WASHERS
12-13 NYLOCK NUT
1/2-13 X 2" BOLT (GR8)

NOT PROVIDED:
5/8-11 BOLTS (GR8)
5/8-11 FLAT WASHERS
5/8-11 NYLOCK NUTS

KIT #:11342
4X M18 FLAT WASHERS,
4X M18X2.5X140mm LONG
4X M18X2.5 LOCK NUT

NOTE: BEFORE INSTALLING AXLE BRACKETS:
RAISE VEHICLE AND SUPPORT WITH JACKSTANDS, REMOVE FRONT WHEELS AND TIRES

NOTE: WHEN INSTALLING AXLE BRACKETS:
DISCONNECT LOWER SHOCK MOUNT AND SUPPORT RADIUS ARM WITH A JACKSTAND OR OTHER MEANS, REMOVE FACTORY HARDWARE AND ATTACH AXLE BRACKETS USING PROVIDED HARDWARE (KIT#11342)

*MUST BE WELDED IN RAIL POSITION: THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVER SIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

DRIVER'S SIDE VIEW OF DRIVER'S SIDE ASSEMBLY

# FORD F-4/550 FRONT INSTALLATION

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)
FRAC, MACH: ± 1/32"
FRAC, OTHER: ± 1/16"
.X ± .063
.XX ± .030
.XXX ± .005
DRILL SIZES: ± .015
ANGULAR: ± 1°
SURF FINISH: 125 MICRO
THREADS: 2A AND 2B
BREAK SHARP EDGES (.010 R MAX)

-

TITLE: MANUAL, '08 F-550 FRONT ASSY INSTALL, RW-1019

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

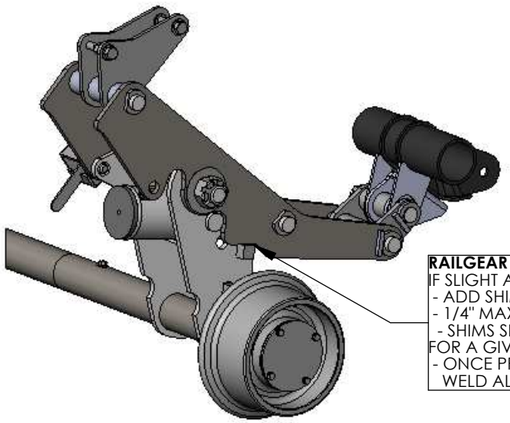
| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/6/11 | M1019102 | # |

FOR SPECIFIC PART NUMBERS REFER TO DRAWING: M1019120

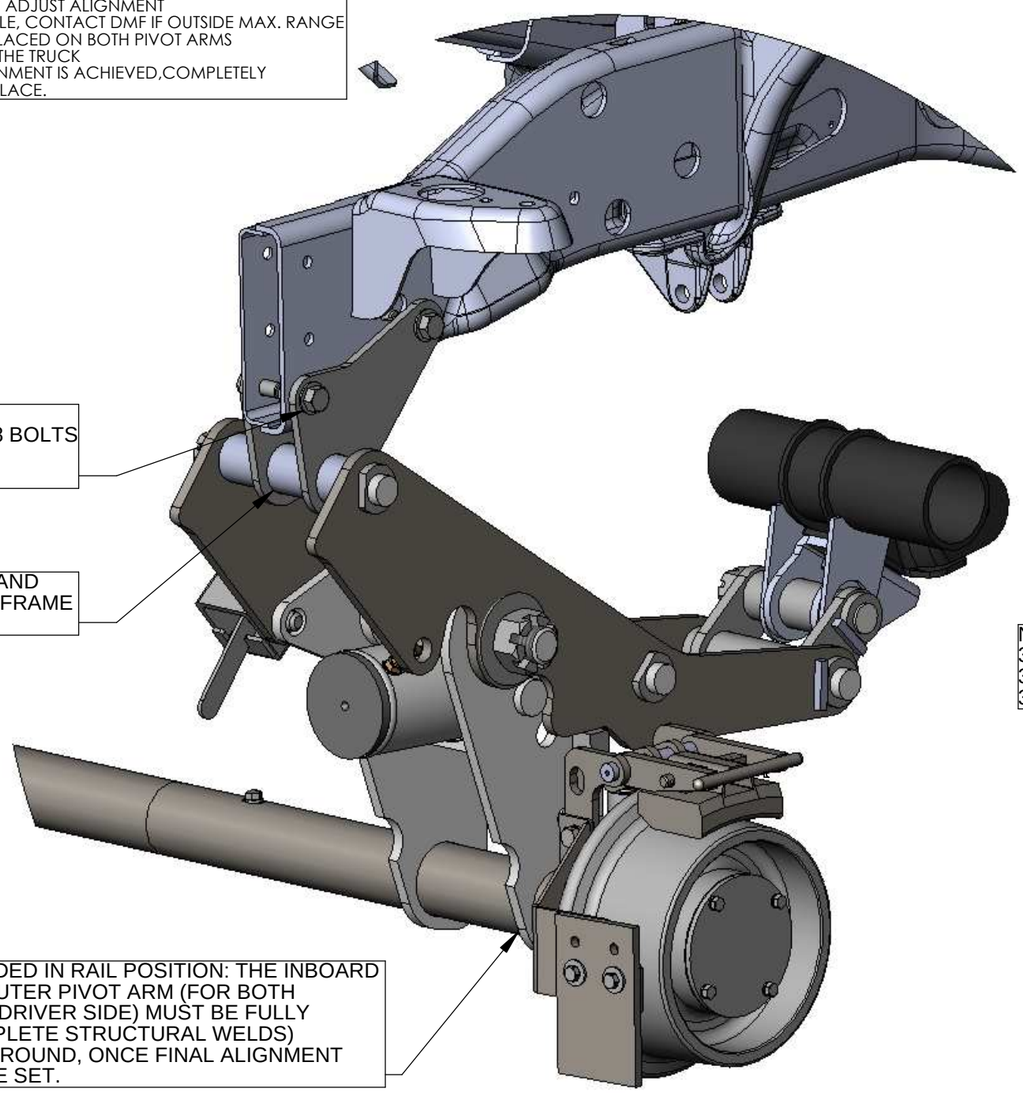
NOTE #1: GRADE 8 BOLTS MUST BE USED WHEN MOUNTING GEAR TO TRUCK FRAME.

NOTE #2: AT FINAL INSTALLATION: (AFTER OVERALL FRONT TO BACK RAILGEAR ALIGNMENT & WEIGHT SETTING HAVE BEEN COMPLETED) FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.

WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS LEAD TO PRE-MATURE BEARING FAILURE



**RAILGEAR ALIGNMENT ADJUSTMENT:**
IF SLIGHT ADJUSTMENTS NEEDED:
- ADD SHIM STOCK TO ADJUST ALIGNMENT
- 1/4" MAX. ALLOWABLE, CONTACT DMF IF OUTSIDE MAX. RANGE
- SHIMS SHOULD BE PLACED ON BOTH PIVOT ARMS FOR A GIVEN SIDE OF THE TRUCK
- ONCE PROPER ALIGNMENT IS ACHIEVED,COMPLETELY WELD ALL SHIMS IN PLACE.



NOT SUPPLIED:
5/8-11 X 1-1/2 GRADE 8 BOLTS
5/8 FLAT WASHERS
5/8-11 NYLOCK NUTS

NOTE: AFTER FINAL ALIGNMENT AND WEIGHTS ARE SET, FULLY WELD FRAME BRACKETS TO CROSSTUBE

*MUST BE WELDED IN RAIL POSITION: THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVER SIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

DRIVER'S SIDE VIEW OF DRIVER'S SIDE ASSEMBLY

NOTE:
- ALIGN FORMED BRACKET WITH WELDMENT ON AXLE
- MATCH DRILL HOLES FOR MOUNTING
- BOLT BRACKET IN PLACE AND POSITION CROSSTUBE AND BRACKET SIDE PLATES
- AFTER FINAL ALIGNMENT, FULLY WELD BRACKET SIDE PLATES AND CROSSTUBE TO AXLE BRACKET

NOT PROVIDED:
3/4-10 GRADE 8 BOLTS
3/4 FLAT WASHERS
3/4-10 NYLOCK NUTS

NOTE: BEFORE INSTALLING AXLE BRACKETS:
RAISE VEHICLE AND SUPPORT WITH JACKSTANDS,
REMOVE FRONT WHEELS AND TIRES

# DODGE/STERLING 45/5500 FRONT INSTALLATION

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | - | - | - | |

TOLERANCES: (UNLESS SPECIFIED)

| | |
|---|---|
| FRAC, MACH: | ± 1/32" |
| FRAC, OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX | ± .005 |
| DRILL SIZES: | ± .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

BREAK SHARP EDGES (.030 X 45° MAX.)

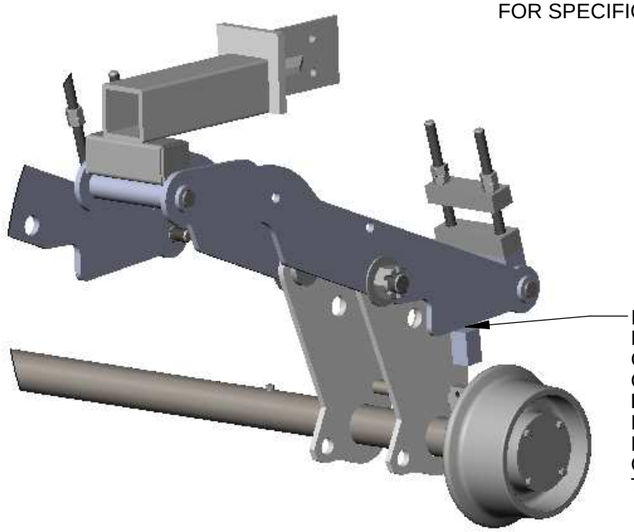
-

TITLE: MANUAL, '08 DODGE/STER 4/5500, FRONT ASSY INSTALL, RW-1019

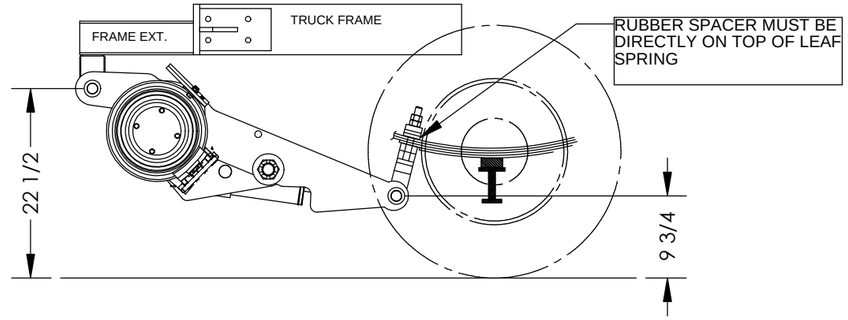
DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| NEH | | 4/27/11 | M1019119 | # |

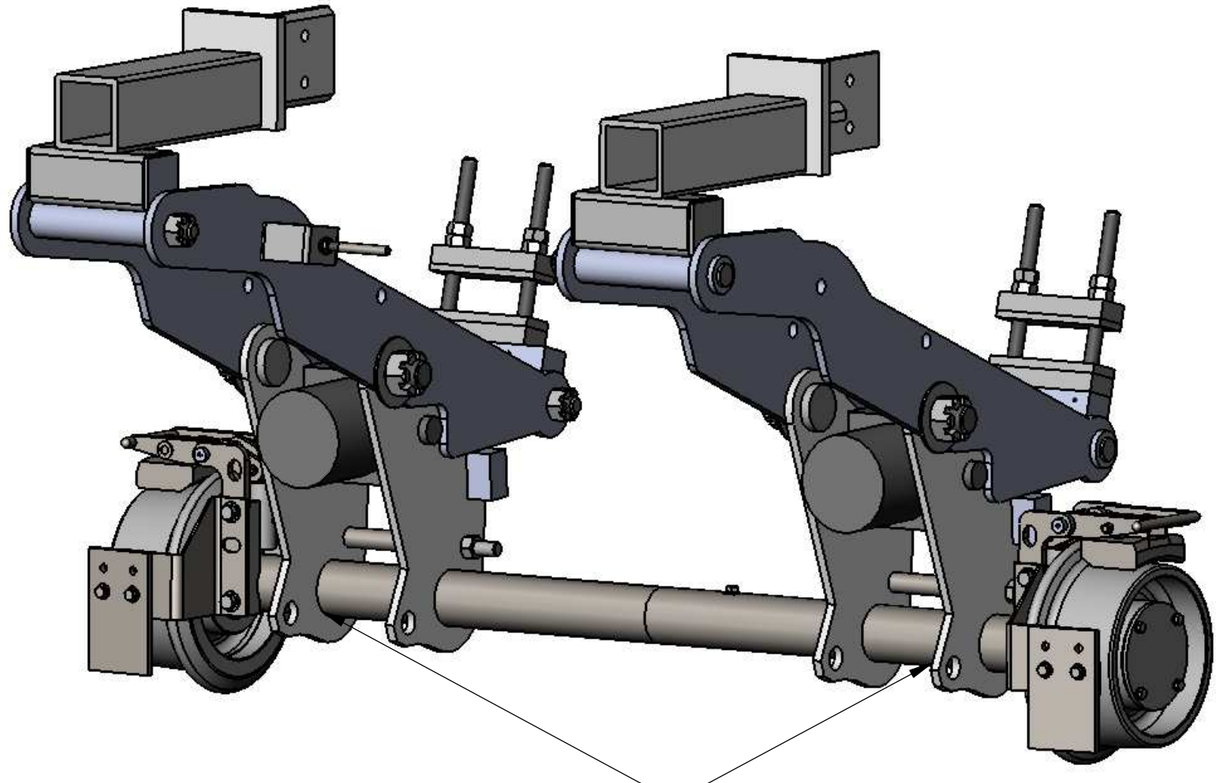
FOR SPECIFIC PART NUMBERS REFER TO DRAWING: M1019110



INSTALL SHIMS HERE
MAX. ALLOWABLE 1/4"
CONTACT DMF IF
OUTSIDE MAX. RANGE
**NOTE:**SHIMS SHOULD
BE PLACED ON BOTH
PIVOT ARMS FOR A
GIVEN SIDE OF THE
TRUCK.




**NOTE: DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY DEPENDING ON OPTIONS YOUR PART MAY NOT BE EXACTLY AS PICTURED**



**MUST BE WELDED IN RAIL POSITION:** THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVERSIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET.

# GM/CHEVY 45/5500 FRONT INSTALLATION

NOTE #1: GRADE 8 BOLTS MUST BE USED WHEN MOUNTING FRAME EXTENSIONS TO TRUCK FRAME

NOTE #2: AT FINAL INSTALLATION

- FOR ALL STRUCTURAL WELDS, EITHER LOW HYDROGEN ROD OR DUAL SHIELD MIG WIRE SHOULD BE USED.
- WARNING: DO NOT ATTACH THE WELDING MACHINE GROUND CLAMP ONTO THE RAIL WHEELS. THIS WILL CAUSE ARCING ACROSS THE BEARINGS INSIDE THE WHEELS & LEAD TO PREMATURE BEARING FAILURE.
- MUST BE WELDED IN RAIL POSITION: THE INBOARD SIDE OF THE OUTER PIVOT ARM (FOR BOTH PASSENGER & DRIVER SIDE) MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) ALL THE WAY AROUND, ONCE FINAL ALIGNMENT & WEIGHTS ARE SET)
- FRONT CROSS TUBES MUST BE FULLY WELDED (COMPLETE STRUCTURAL WELDS) TO TRUCK FRAME OR FRAME EXTENSIONS ALL THE WAY AROUND.
- IF SHIMS REQUIRED, RULLY WELD ALL SHIMS IN ALL LOCATIONS, IN PLACE, ONCE ALIGNMENT IS ACHIEVED (IF MORE THAN ONE SHIM PER LOCATION, THEN ALL SHIMS USED AT LOCATION SHOULD BE WELDED TO ONE ANOTHER.)

NOTE #3:

- ONCE SPRING BRACKET IS FINALLY SET, WHERE CLEARANCE ALLOWS, LEAVE 1" THREADED ROD EXPOSED ABOVE NUT (2 THREADS MIN.) - SEE ABOVE ILLUSTRATION

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| 2 | | | | |
| 1 | - | - | - | |

| TOLERANCES: (UNLESS SPECIFIED) | | | | |
|---|---|---|---|---|
| FRAC., MACH: | ± 1/32" | - | TITLE: MANUAL, '08 C4/5500 FRONT ASSY INSTALL, RW-1019 | |
| FRAC., OTHER: | ± 1/16" | | | |
| .X | ± .063 | | | |
| .XX | ± .030 | | DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512 | |
| .XXX | ± .005 | | | |
| DRILL SIZES: | ± .015 | DRAWN BY: NEH / APPD BY: | DATE: 4/7/11 | DRAWING NUMBER: M1019103 / REV: # |
| ANGULAR: | ± 1° | | | |
| SURF FINISH: | 125 MICRO | | | |
| THREADS: | 2A AND 2B | | | |

BREAK SHARP EDGES (.015 R X 45° MAX.)

## ALIGNMENT PROCEDURE

A) STEPS 1) and 2) must be completed in listed order and are assumed to be within specifications and should only be addressed, if after alignment of the railgear, excessive flanging occurs.

1) Frame should be square, to within 1/8" maximum, on the diagonal.

2) Rear drive axle should be square to frame within 1-1/6" maximum on the diagonal to achieve 0° thrust angle. this should be checked by a qualified alignment shop.

B) The following procedure applies to shop or field inspection.

1) Check air pressure in all tires. tires should be inflated to the minimum rating of the wheel or tire.

2) Place vehicle on straight and level track, or 3" channel to simulate rail. Lower the railgear to the rail so that front to rear and diagonal measurements can be made. (Note: these measurements can be made from any convenient locations, as long as it stays consistent from side to side.

3) If diagonal measurement is out of tolerance, adjustment of the front railgear must be made. The procedure for this is as follows (for D-1 & D-2 only): Place shim material between the stop block on the pivot arm (see dwg below) & where it comes into contact with the long arm. The location for the shim is most accessible from behind the front Railgear axle (example: shim on left side, it will push left axle forward). Once proper shimming has been obtained, weld the shim into place on the pivot arm. Max. allowable 1/4" - Contact DMF if outside the maximum range.

## TRACTION ADJUSTMENT PROCEDURE

Tire traction varies w/ every truck based on several factors such as weight & tire design. It can also vary on the same truck as equipment is added or deleted. Thus, we recommend performing the traction adjustments after all equipment is installed or removed. Since every truck differs, there is no exact procedure. However, we have found the following two methods to be a good guide. The true test is how the vehicle performs on rail.

### METHOD #1

Note: Method #1 is a visual procedure of the tire capping on rail.

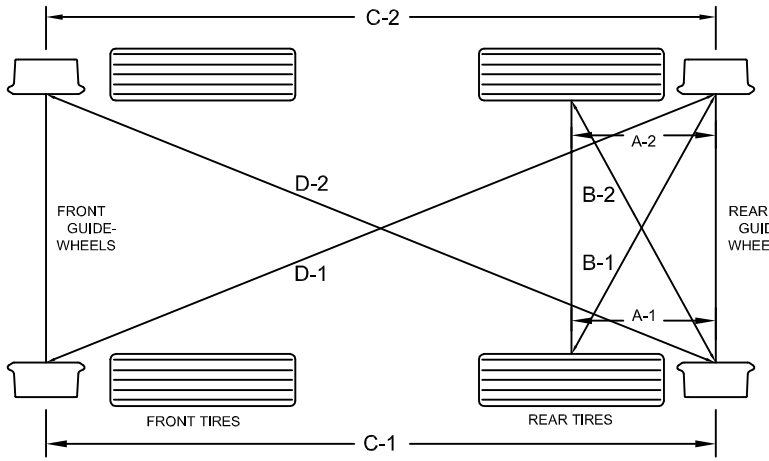
1) Grind off the welds on the (2) four hole mounting plates at the rear mounting bracket.
2) Loosen the (8) rear bracket mounting bolts.
3) Lower the railgear supporting the railgear with a floor jack or with the unit itself.
4) Remove or add spacer shim material located between the bottom of the truck frame and the shelf on the rear mounting bracket. Add shim to decrease traction and remove shim to increase traction (ref. side dwg. for illustration of proper tire capping).
5) Raise Railgear once again to contact the bottom of the truck frame.
6) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If multiple spacers are used, remember to weld spacers to one another.

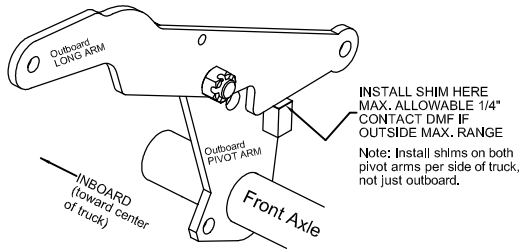
### METHOD #2

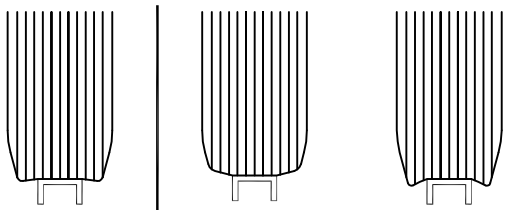
Note: Method #2 distributes the vehicles rear axle(s) weight(s) equally over all rear axles, including the Railgear.

1) If truck scales are available, weigh the vehicle's rear axle (if tandem, weigh both)
2) With front and rear Railgear lowered, add or remove shims until rear Railgear axle weight is distributed equally between rear truck axle & Railgear.
3) Once weight is equally distributed, then stow Railgear.
4) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If have multiple spacers, remember to weld spacers to one another.

| INSPECTOR: | | DATE: | |
|---|---|---|---|
| SPECIFICATION | S/B = to | SPECIFICATION | TOLERANCES |
| A–1 | = | A–2 | ± 1/16" |
| B–1 | = | B–2 | ± 1/8" |
| C–1 | = | C–2 | ± 1/8" |
| D–1 | = | D–2 | ± 1/4" |





Outboard LONG ARM
INSTALL SHIM HERE MAX. ALLOWABLE 1/4" CONTACT DMF IF OUTSIDE MAX. RANGE
Note: Install shims on both pivot arms per side of truck, not just outboard.
Outboard PIVOT ARM
INBOARD (toward center of truck)
Front Axle



**Frame Set OK** | **Frame Too High** | **Frame Too Low**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS

| | |
|---|---|
| FRAC. MACH: | ± 1/32" |
| FRAC. OTHER: | ± 1/16" |
| .X | ± .063 |
| .XX | ± .030 |
| .XXX OR .XXXX | ± .005 |
| DRILL SIZES: | ± .015 |
| ANGULAR: | ± 1° |
| SURF FINISH: | 125 MICRO |
| THREADS: | 2A AND 2B |

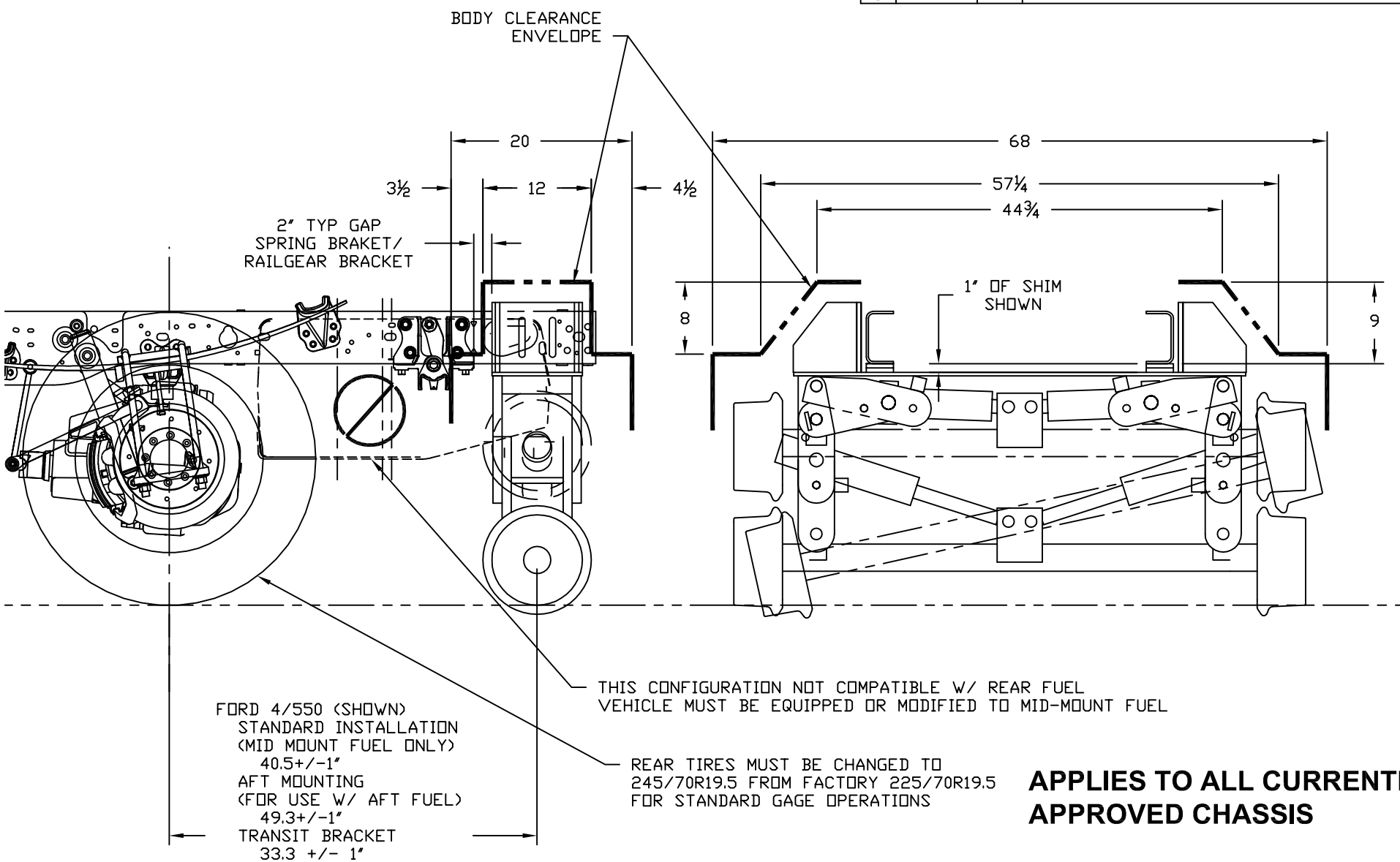
BREAK SHARP EDGES ( 0.000 X 45° MAX )

TITLE: ALIGNMENT PROCEDURE & TEAR SHEET & TRACTION ADJUSTMENT PROCEDURES

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| JBG | | 11/03/10 | M1019115 | # |

| ITEM | PART NO. | QTY | DESCRIPTION |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |




FORD 4/550 (SHOWN)
STANDARD INSTALLATION
(MID MOUNT FUEL ONLY)
40.5+/-1"
AFT MOUNTING
(FOR USE W/ AFT FUEL)
49.3+/-1"
TRANSIT BRACKET
33.3 +/- 1"
DODGE 45/5500
40.0+/-1"
AFT MOUNTING
56.0+/-1"
GM 45/5500
39.0+/-1"

**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS
FRAC. MACH ± 1/32"
FRAC. OTHER ± 1/16"
.X ± .063
.XX ± .030
.XXX OR .XXXX ± .005
DRILL SIZES + .015
ANGULAR ± 1°
SURF FINISH 125 MICRO
THREADS 2A AND 2B
BREAK SHARP EDGES ( 0.030 X 45° MAX )

RW-1019

TITLE: MANUAL, RW-1019 REAR BODY CLEARANCES

DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512

| DRAWN BY: | APPD BY: | DATE: | DRAWING NUMBER: | REV: |
|---|---|---|---|---|
| WAK | | 12/15/09 | M1019131 | # |

## ALIGNMENT PROCEDURE

A) STEPS 1) and 2) must be completed in listed order and are assumed to be within specifications and should only be addressed, if after alignment of the railgear, excessive flanging occurs.

1) Frame should be square, to within 1/8" maximum, on the diagonal.

2) Rear drive axle should be square to frame within 1-1/6" maximum on the diagonal to achieve 0° thrust angle. this should be checked by a qualified alignment shop.

B) The following procedure applies to shop or field inspection.

1) Check air pressure in all tires. tires should be inflated to the minimum rating of the wheel or tire.

2) Place vehicle on straight and level track, or 3" channel to simulate rail. Lower the railgear to the rail so that front to rear and diagonal measurements can be made. (Note: these measurements can be made from any convenient locations, as long as it stays consistent from side to side.

3) If diagonal measurement is out of tolerance, adjustment of the front railgear must be made. The procedure for this is as follows (for D-1 & D-2 only): Place shim material between the stop block on the pivot arm (see dwg below) & where it comes into contact with the long arm. The location for the shim is most accessible from behind the front Railgear axle (example: shim on left side, it will push left axle forward). Once proper shimming has been obtained, weld the shim into place on the pivot arm. Max. allowable 1/4" - Contact DMF if outside the maximum range.

## TRACTION ADJUSTMENT PROCEDURE

Tire traction varies w/ every truck based on several factors such as weight & tire design. It can also vary on the same truck as equipment is added or deleted. Thus, we recommend performing the traction adjustments after all equipment is installed or removed. Since every truck differs, there is no exact procedure. However, we have found the following two methods to be a good guide. The true test is how the vehicle performs on rail.

### METHOD #1

Note: Method #1 is a visual procedure of the tire capping on rail.

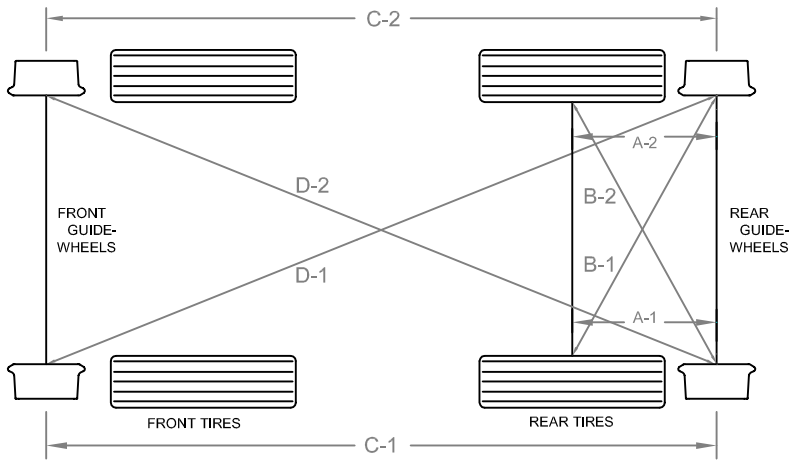
1) Grind off the welds on the (2) four hole mounting plates at the rear mounting bracket.
2) Loosen the (8) rear bracket mounting bolts.
3) Lower the railgear supporting the railgear with a floor jack or with the unit itself.
4) Remove or add spacer shim material located between the bottom of the truck frame and the shelf on the rear mounting bracket. Add shim to decrease traction and remove shim to increase traction (ref. side dwg. for illustration of proper tire capping).
5) Raise Railgear once again to contact the bottom of the truck frame.
6) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If multiple spacers are used, remember to weld spacers to one another.

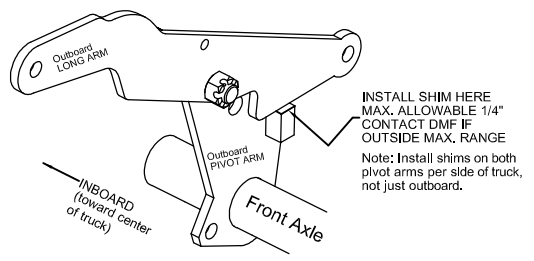
### METHOD #2

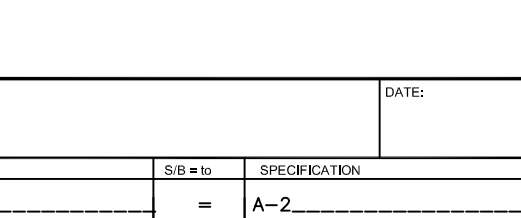
Note: Method #2 distributes the vehicles rear axle(s) weight(s) equally over all rear axles, including the Railgear.

1) If truck scales are available, weigh the vehicle's rear axle (if tandem, weigh both)
2) With front and rear Railgear lowered, add or remove shims until rear Railgear axle weight is distributed equally between rear truck axle & Railgear.
3) Once weight is equally distributed, then stow Railgear.
4) Re-tighten the rear mounting bracket bolts to 154 ft/lb. torque and re-weld the mounting plates, and shims to the bracket (per rear install detail in section 5.1). If have multiple spacers, remember to weld spacers to one another.

| INSPECTOR: | | DATE: | |
|---|---|---|---|
| SPECIFICATION | S/B = to | SPECIFICATION | TOLERANCES |
| A–1_____ | = | A–2_____ | ± 1/16" |
| B–1_____ | = | B–2_____ | ± 1/8" |
| C–1_____ | = | C–2_____ | ± 1/8" |
| D–1_____ | = | D–2_____ | ± 1/4" |



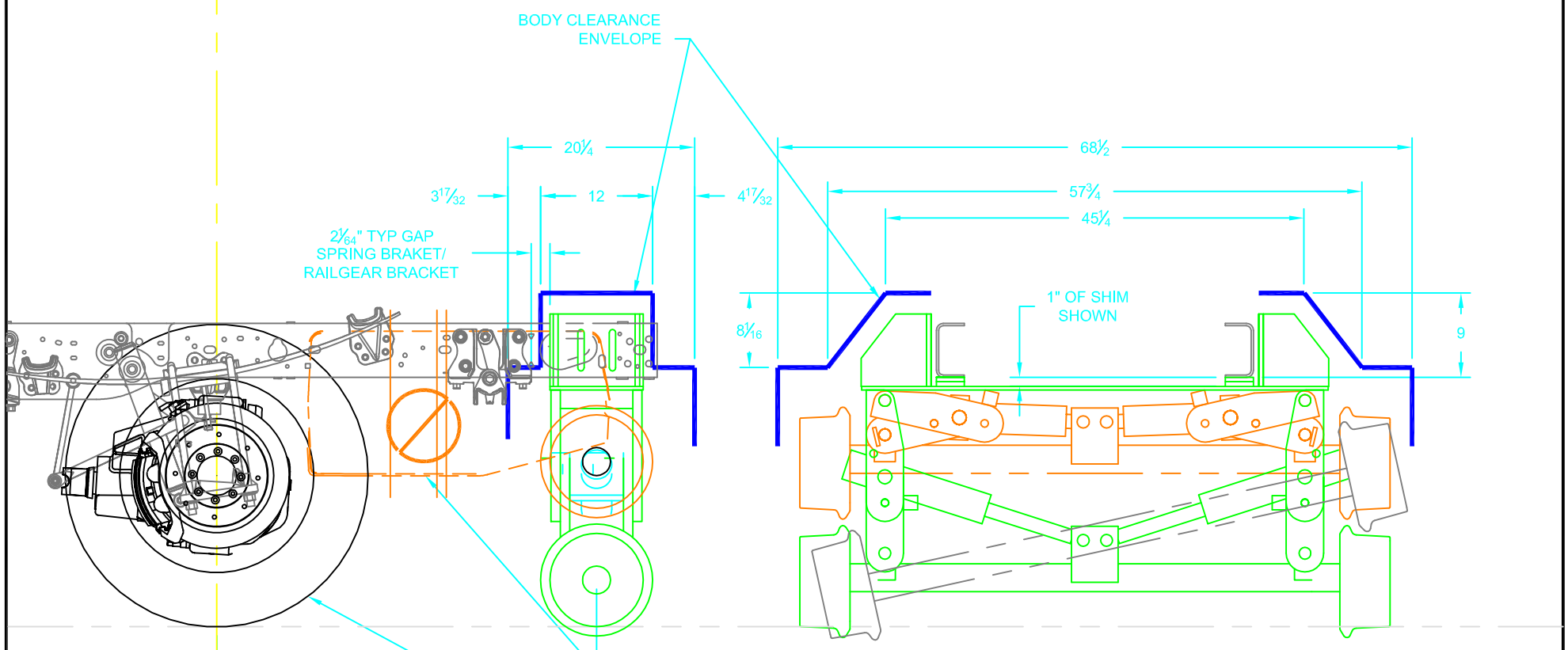


Outboard LONG ARM
INSTALL SHIM HERE MAX. ALLOWABLE 1/4" CONTACT DMF IF OUTSIDE MAX. RANGE
Note: Install shims on both pivot arms per side of truck, not just outboard.
Outboard PIVOT ARM
INBOARD (toward center of truck)
Front Axle



**Frame Set OK** **Frame Too High** **Frame Too Low**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

| TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS | | DRAWN BY: | APPD BY: | TITLE: ALIGNMENT PROCEDURE & TRACTION ADJUSTMENT PROCEDURES | | | |
|---|---|---|---|---|---|---|---|
| FRAC, MACH: | ± 1/32" | | | DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512 | | | |
| FRAC, OTHER: | ± 1/16" | | | DATE: | | DRAWING NUMBER: | REV: |
| .X | ± .063 | JBG | | 11/03/10 | DMF | M1019115 | # |
| .XX | ± .030 | | | | | | |
| .XXX OR .XXXX | ± .005 | | | | | | |
| DRILL SIZES: | ± .015 | | | | | | |
| ANGULAR: | ± 1° | | | | | | |
| SURF FINISH: | 125 MICRO | | | | | | |
| THREADS: | 2A AND 2B | | | | | | |
| BREAK SHARP EDGES ( 0.030 X 45° MAX ) | | | | | | | |




**APPLIES TO ALL CURRENTLY APPROVED CHASSIS**

| REV | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| B | | | | |
| A | | | | |

| TOLERANCES: (UNLESS SPECIFIED) COMMON SENSE PREVAILS | | RW–1019 | | TITLE: MANUAL, RW–1019 REAR BODY CLEARANCES | | | |
|---|---|---|---|---|---|---|---|
| FRAC, MACH: | ± 1/32" | | | DIVERSIFIED METAL FABRICATORS,INC.(404)875-1512 | | | |
| FRAC, OTHER: | ± 1/16" | | | DATE: | | DRAWING NUMBER: | REV: |
| .X | ± .063 | DRAWN BY: | APPD BY: | 12/15/09 | DMF | M1019131 | # |
| .XX | ± .030 | | | | | | |
| .XXX OR .XXXX | ± .005 | WAK | | | | | |
| DRILL SIZES: | ± .015 | | | | | | |
| ANGULAR: | ± 1° | | | | | | |
| SURF FINISH: | 125 MICRO | | | | | | |
| THREADS: | 2A AND 2B | | | | | | |
| BREAK SHARP EDGES ( 0.030 X 45° MAX ) | | | | | | | |